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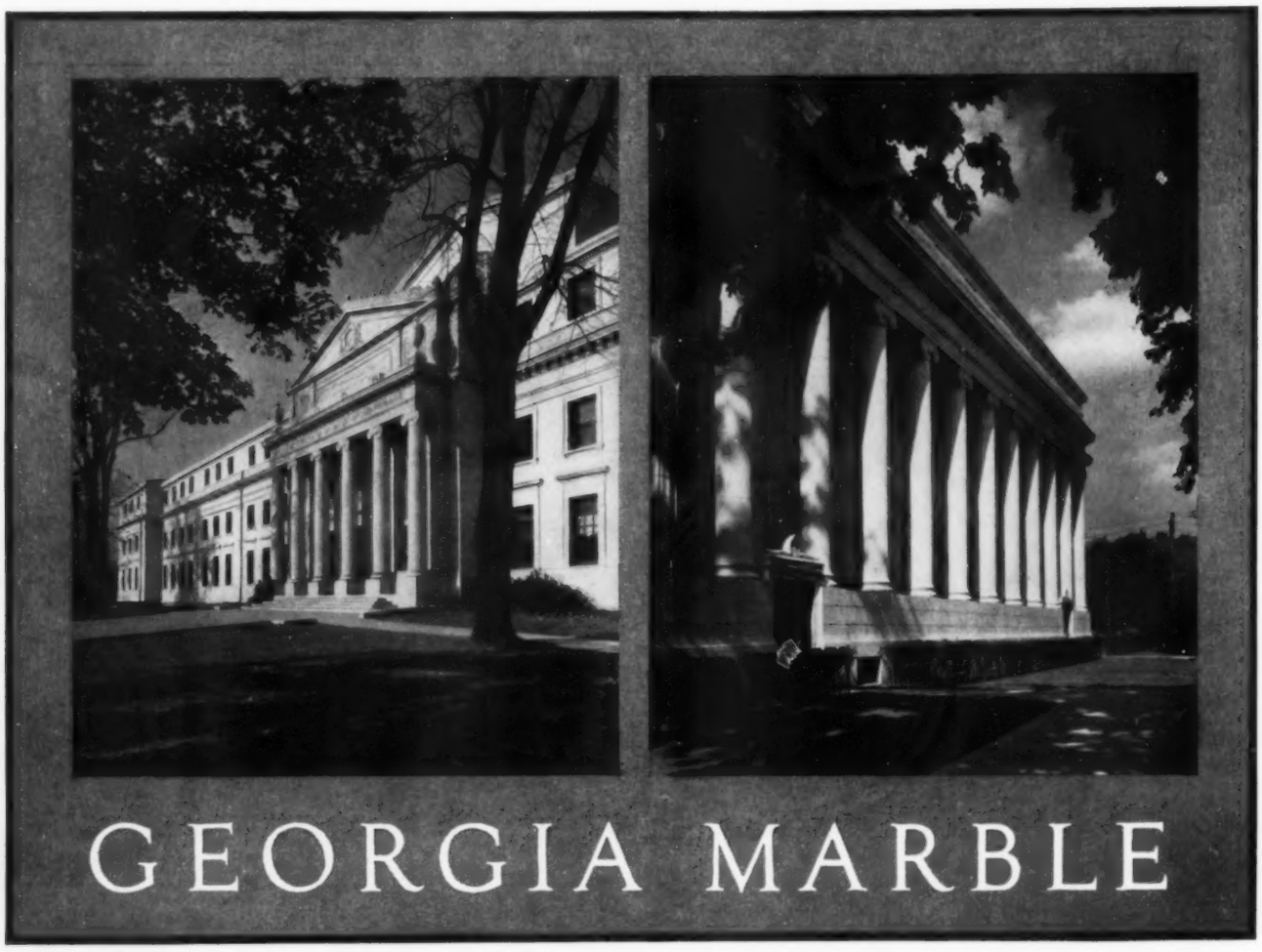

DELAWARE COUNTY COURT HOUSE, MEDIA, PENNA.
CLARENCE W. BRAZER, architect for the old building, erected in 1913, and for the present additions.
Left. South facade looking west. *Right.* East end colonnade (entirely new).

ALL of the exterior marble work of the new portions of the Court House at Media is Georgia Marble. This work consists of the addition of a large wing at each end, a third story to the old building and a law library extending above the roof of the center portion.

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THE ARCHITECTURAL RECORD

VOL. 71 NO. 6 JUNE, 1932

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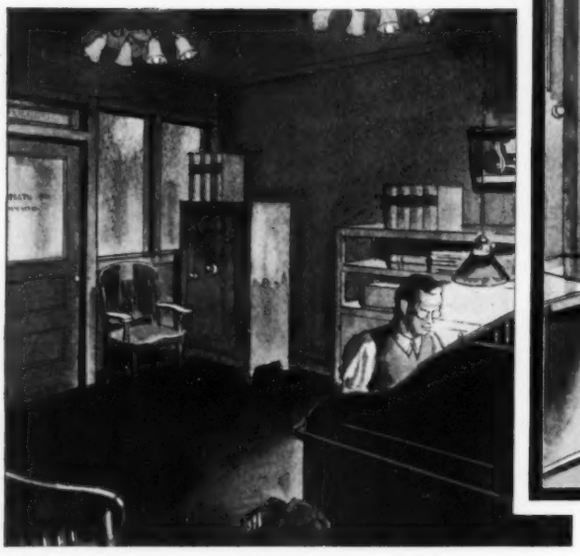
New OFFICES *for Old*



Loss of "atmosphere" has proved costly to many older buildings in these highly competitive days. Newer buildings are attracting more and more tenants, while in the older ones rental income is diminishing and overhead increasing. In many cases a new lighting system has proved an effective check to tenant dissatisfaction and has paved the way to complete rehabilitation of buildings and also a restoration of their former prestige. Macbeth lighting globes are ideal for this purpose, being truly modern in both appearance and performance.

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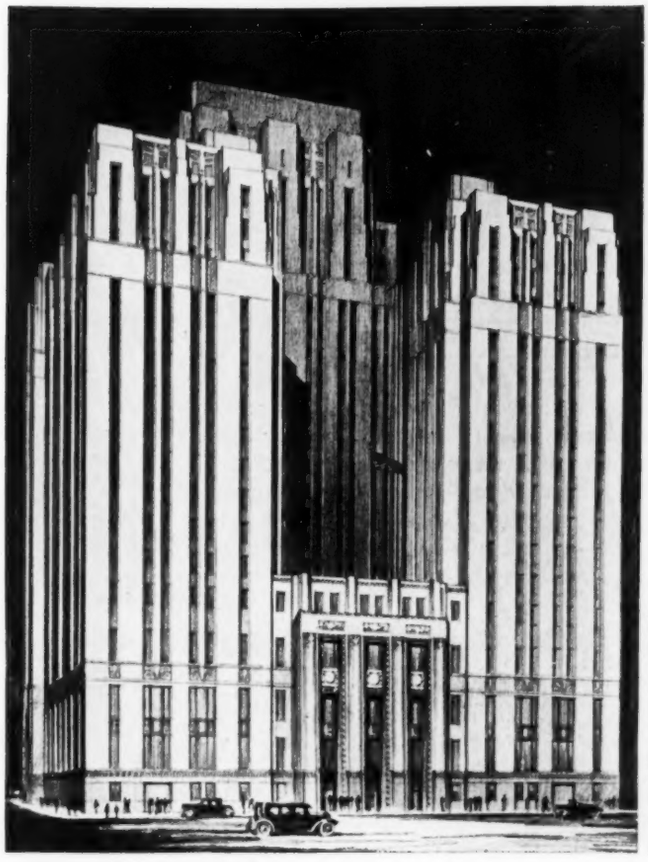

Federal Post Office, Boston. Architects: *Cram and Ferguson*, Boston. General Contractor: *N. P. Severin Construction Company*, Chicago. Subcontractor on Aluminum Work: *Art Metal Construction Company*, Jamestown, N.Y.

Practically all metal on the facade of the Boston Post Office is Alcoa Aluminum . . .

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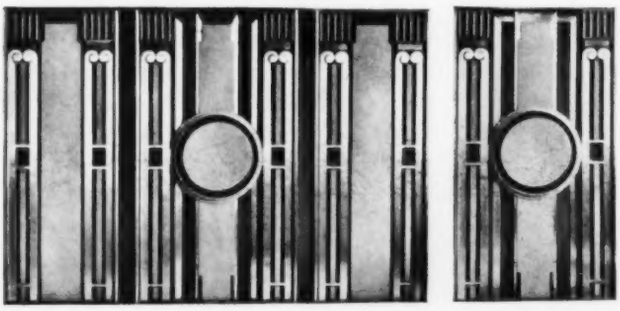
In addition, Alcoa Aluminum is resistant to corrosion. It cannot rust or streak adjoining surfaces. Its enduring beauty, strength and lightness have caused it to be used widely for spandrels, store fronts, cornices and copings, sills, window frames and sash, skylights, roofing and decorative facades; for entrance doors, elevator doors and cabs and for countless other objects.

To obtain absolutely satisfactory architectural aluminum, specify Alcoa Aluminum and its alloys, made by Aluminum Company of America. In planning the use of Alcoa Aluminum in your next project, we urge you to accept our cooperation. Write ALUMINUM COMPANY *of* AMERICA; 2467 Oliver Building, PITTSBURGH, PENNSYLVANIA.

Alcoa Aluminum was used for the 1306 spandrels, 1585 windows (double-hung and projected type sash) exterior grilles, cast panels in entrance and large windows, outside doors and frames.

Due to the lightness of Alcoa Aluminum, huge spandrels like the one, below at left, weigh only 436 pounds. They were cast in three sections and when assembled measured 10' 8" x 7' 2". Finish is sandblasted, partially deplated and highlighted.

The single unit spandrels, below at right, cast in Alcoa Aluminum weigh only 132 pounds and measure 3' 4" x 7' 2".



ALCOA ALUMINUM

CORRESPONDENCE FROM ARCHITECTS

WHY I LIKE THE AMERICAN INSTITUTE OF ARCHITECTS . . . . . C. W. FAIRWEATHER

To the Editor:

One of the younger members of the A. I. A. recently said to me, "I have almost come to the conclusion that the Institute isn't doing anything for me. Why should I do anything for it?" Often one hears the questions, "What has the Institute done for the profession?" and the reply, "Everything that has been done for the profession." No one, of course, seriously thinks that everything that has been done for the profession has been done by the Institute. Much important work has been done by local societies. Individual architects have signally advanced our cause, but the standing of the profession today is in the main due to the self-sacrificing work which has been accomplished by the members of the Institute through their technical society during the past seventy-five years.

Without doubt the Institute has not done all that could be done. Without doubt it has not always made the wisest decision. Often it has had to grope its way in solving vexatious problems, but for all those years it has labored to "promote the aesthetic, scientific and practical efficiency of the profession and to make the profession of ever-increasing service to society."

Sometimes it is said that the Institute is not a democratic body. Perhaps it is not, but it is certainly democratic to the extent that any architect who possesses reasonable competence and is willing to practice along ethical lines is eligible to join. One may say that the British House of Lords is not a democratic body and say it with some justice because it is hard to become a Lord: but any honest to goodness architect can join the Institute and if the point of view of the Institute does not always reflect the attitude of the little fellow that is no reason for the little fellow to stay out. It is a compelling reason for him to come in and democratize the Institute.

During the twenty years of my membership there have been various occasions on which I was out of sympathy with Institute policy but I never felt that my logical course was to resign. I felt that the thing to do was to stick and fight for what I believed to be right and always I have received a courteous and friendly hearing. To cite a case: For years I have opposed the Institute's contact with the Small House Service Bureau without getting very far, but the members listen to me just as patiently as ever and some day I am going to make the Institute let go of that baby if I can.

You who wonder what the Institute has done for you, think of the standard documents. Whether you use them or not, you know their value as a guide. Architects and laymen alike recognize the schedule of minimum charges and lean on it in time of trouble. That schedule backed as it is by the prestige of the Institute has served us all well. Shouldn't you join and do your bit to help?

Taking the 1931 Annuary as our guide, we find George Keller of Hartford listed after sixty-two years of service. Aside from the service consider the cash contribution which Mr. Keller has made to the profession. For the past twenty years in my chapter national and local dues have averaged $35. What they have been in his chapter I can only conject, but it is safe to say that his contributions compounded annually would reach the sum of $7,500, a sizable fortune in the architectural profession.

Then there are James W. Reid of San Francisco, Henry Hoppin of Providence and W. R. Briggs of Stratford who have given more than fifty years of loyal help, and a group of other men who have been with us since the early eighties, including Glenn Brown and that inveterate traveler, W. L. Plack, who joined in 1884 and looked spryer than ever at the San Antonio convention last spring.

A hardy race of men were the westerners who merged their own society with ours in the eighties. A score of them are going strong today, including John M. Donaldson, Charles S. Frost, George D. Mason and other well-known men.*

Still in the eighties, we find A. F. Gauger, C. P. H. Gilbert, W. Carbys Zimmerman and others.

Coming down to "the gay nineties" we find a host of what one might call household names in architecture: Ittner, Sturgis, Mullgardt, Ditmars, Hewlett and Grylls.

In 1900 the Institute had a stroke of luck, the New Jersey Chapter being formed. Bob Dixon and Wilson C. Ely, charter members, are still on the job. Pilcher, Ranken, Van Pelt, Tilton, Granger and Chambers also came in that year. The class of 1901 must have been a big one, for some seventy members are still with us, including Klauder, Cram, Bragdon, Kelsey and Atterbury.

President Kohn joined in 1903 and how he has worked! The list of distinguished names belonging to the first decade of the century also includes Pope, Magonigle, Litchfield, Delano and Aldrich, Hunt, Cret, Corbett, Swartwout and others with notable records.

The Institute had another stroke of luck in 1911 as any one may see who cares to gather statistics concerning the writer of this letter. Herrick Hammond also joined that year and he has been president. Many good men have joined since that time and we would like to name them all. We note that those distinguished writers, Ripley and La Beaume and Flagg, Dunning, Upjohn and Paul A. Davis III, came in during the second decade.

*Note: I should like the secretary of the A. I. A. to know that it was a tedious job digging these vital statistics out of the Annuary in its present arrangement. Probably a lot of mistakes have been made. I hope that next year he will list the members by their date of admission.

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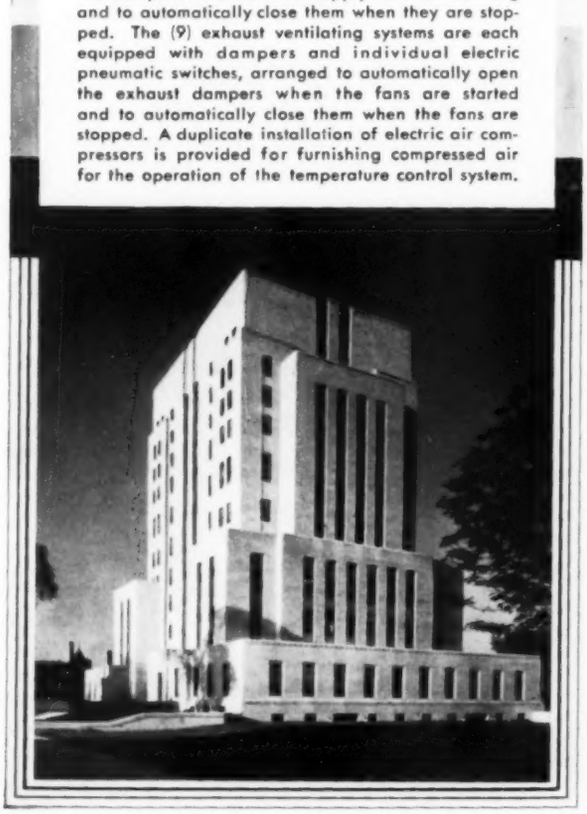
HEAT AND HUMIDITY CONTROL « « « « «

THE RACINE COUNTY COURT HOUSE, Racine, Wisconsin. Holabird & Root, Architects, equipped with Johnson Control. All of the direct radiation, both of the concealed and cast iron type, consisting of (346) radiators, is controlled by means of (181) room type gradual acting thermostats. The temperature of the air delivered by (4) supply ventilating systems, is completely controlled by means of sylphon valves and automatic by-pass dampers, by multiple type thermostats in the discharge ducts of the several systems. The fresh air intake dampers for the supply fans are each equipped with electric pneumatic switches which are arranged to automatically open the dampers whenever the supply fans are running and to automatically close them when they are stopped. The (9) exhaust ventilating systems are each equipped with dampers and individual electric pneumatic switches, arranged to automatically open the exhaust dampers when the fans are started and to automatically close them when the fans are stopped. A duplicate installation of electric air compressors is provided for furnishing compressed air for the operation of the temperature control system.



When installed, the Johnson System assures permanence . . . in its operation and service. This is because the Johnson System is fundamentally correct . . . in principle, design, construction and application. It is also because the Johnson System is installed specifically to each building's requirements . . . and specifically to every form, plan and system of heating and ventilating. And it is finally because this company, established in 1885 and covering the continent with thirty-one branches, assures resources to remain permanently responsible for each Johnson installation made.

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Buffalo	Des Moines	Minneapolis	Salt Lake City	Toronto, Ont.
Chicago	Detroit	New York	San Francisco	Vancouver, B. C.

JOHNSON HEAT AND HUMIDITY CONTROL

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Mr. Davis joined in 1918 and he has been president of his chapter and director of the Middle Atlantic Division and is now chairman of the Jury of Fellows. Which shows that one can gain rapid promotion in the Institute if one has ability, works hard and belongs to the Philadelphia Chapter.

There was a rush to the colors in 1921. We don't know how many men joined that year but about five hundred of them are still with us, and there are some very good names in the list. Ely Kahn and Howard Greenley for instance. From then until the present our ranks have been swelled by men like Gmelin, Rebori, Edgell, Hood, Price, Van Alen, Guptil and Saarinen, men who are eminently fitted to carry on the traditions of the past.

Among the women who are serving with distinction, the Mmes. Almy, Budd, Butterfield, Coit, Manning, Mead, Morgan, Nedved, Raymond and Yeatman may be mentioned and of course Miss Lois Lilley Howe.

To the younger members and to those who are going to join, we say hail! Hail and reign.

CLEMENT W. FAIRWEATHER, A. I. A.
New Jersey.

ARCHITECTURAL CRITICISM . SMALL HOUSES

To the Editor:

There is a wonderful opportunity in the architectural profession for constructive criticism; particularly by a man whose criticisms will be a guidance and an inspiration to the many architects such as ourselves scattered throughout the United States.

You are, no doubt, familiar with the fact that there are many men in the architectural profession who have not had the broadening experience of university education, a reasonable amount of travel, and above all, they have had little or no association with outstanding men in the profession. After all is said and done, it is these men who really do the bulk of the architectural service of our country. They look to the recognized professional journals and the material contained therein for guidance and a possible solution to their own problems. No doubt many published examples of poor architecture have been the seeming inspiration for many others scattered here and there. Possibly this comes from the psychological fact that anything seen in print is so, or expresses a truth, and that published in the professional journals must accordingly be of the best.

We look forward to your finding some one who will at least in part fulfill some of your requirements and will separate the wheat from the tares. Such a critic would be of vast importance to you if he could get the viewpoint of the small office, if he could write, talk and discuss these things in the language or vernacular that the small men could understand. Most of the criticisms are from men whose associations have been in the big cities. Their viewpoint, their attitude and their language is of such character that the rest of the country seems provincial and to some even semi-barbaric. As a consequence the small offices are not reached, their sense of proportion is not appealed to and the real purpose of the criticisms is largely lost.

. . .

Our section of the country is no different from other sections as to the problem of reasonably priced small houses. We can not but feel that the speculative builder, the unrestrained real estate developers, have been largely responsible for small house conditions in general. The public as you know is very gullible and has been easily led. The house under $10,000 has not been a profitable field for architectural service. As a consequence the architects are largely to blame in permitting the small housing to get beyond their reach or control and into the hands of unscrupulous builders and operators. There are thousands of purchasers of small houses throughout our section who are awakening to the realization that they have white elephants on their hands. The homes which they purchased a short time ago now are not worth the first mortgages placed upon them. The second mortgages, the cash payments and the payments which have been made against the original principals have gone for tremendous discounts, excess profits and other numerous charges that never did represent any real worth on their investments.

This problem of financing along reasonable or equitable lines is the greatest problem facing our small housing today. Possibly it can be solved. Surely it calls for a great deal of consideration. We feel the architectural profession as a whole is most vitally interested, also our better banking and financial institutions. These working together must somehow educate our small house owners and through a process of liberal education show them the advantages of better built and reasonably financed small construction. We are afraid that if something along these lines is not carried forward in the near future thousands of home owners that have been badly burned will never again enter into the problem of home building or home purchasing but will be content to paste rent receipts in their scrap books for the remainder of their lives.

Small houses can be built of good material, good design and substantial workmanship for reasonable prices in our section of the country, composed of building supplies now upon the American market without the necessity of having weird and fantastic abortions or painstaking research for new, unused, untried materials. The average architectural firm located throughout our section is capable of rendering this service to the small home builder. Our banks, under a more liberalized banking law, could provide the proper finances without tremendous discounts and they could free this vast majority of the home building public from the clutches of the unscrupulous operator and financial companies that have handled his papers at enormous charges.

FRED W. CLARKE, A. I. A.
Owen & Clarke, Architects,
Mobile, Alabama.

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EXHIBITIONS AND EVENTS

June 20-24	Annual meeting, in Atlantic City, of the American Society for Testing Materials.
June 20-October 1	"The Designer and Industry"—exhibition of The National Alliance of Art and Industry at the Art Center Building, New York City.
June 25-August 19	Modern architecture tour of Europe, conducted by Prof. Talbot F. Hamlin of Columbia University. Address The American Institute of Educational Travel, 587 Fifth Avenue, New York City.
July 30-August 14	Exhibition of art at the Los Angeles County Museum in conjunction with the American Olympiad competition of sports buildings by architects of the nations invited to the Olympic games. Address Secretary, American Olympic Committee, 233 Broadway, New York City.
October	International Congress for Modern Architecture at Moscow, U. S. S. R. Program: "The Functional City."

COMPETITIONS

June 15	Closing date for entries for Douglas Fir Plywood Manufacturers design competition. Address C. H. Alden, professional advisor, Skinner Building, Seattle, Wash.

A. I. S. C. BRIDGE AWARDS

Boris R. Leven, a student in the College of Architecture, University of Southern California, won first place in the annual bridge design competition held by the American Institute of Steel Construction. The problem was to design a highway grade separation bridge over a railroad crossing. Edward S. Okubo, from the same college, won second place in the competition, while third place went to Leslie E. McCullough, a student in the Department of Architecture, Iowa State College.

A. Lyall House, a student in the Department of Civil Engineering, Montana State College, was given honorable mention. Pierre A. Bezy and D. E. Campanella, both students in the School of Architecture, Columbia University, were also selected for honorable mention.

"THE DESIGNER AND INDUSTRY"

The National Alliance of Art and Industry announces the first national exhibition of three-dimensional objects produced by industry, to be shown from June 20 to October 1. This Exhibit, "The Designer and Industry," will be held at the Art Center Building, 65 East 65th Street, New York City.

Designers from all over the country will be represented and the merchandise to be displayed ranges from containers and packages to the newest subway turnstile.

Applications for exhibits may be sent to Alon Bement, Director of the National Alliance of Art and Industry at 65 East 56th Street, New York, on or before June 1.

ANNOUNCEMENTS

Edwin W. Byers, architect, has moved from Flint, Michigan, to 1203 Chicago Avenue, McAllen, Texas.

•

PRIX DE ROME AWARDS

George Nelson, of Hartford, Conn., and Henri E. Chabanne, of Trails End, Tompkins Corners, N. Y., have been awarded the annual Prix de Rome awards in architecture and landscape architecture, respectively.

The award in architecture is the William Rutherford Mead fellowship, while the landscape prize is endowed by the Garden Club of America.

BROWN SCHOLARSHIP AWARDS

The following awards have been made in the judgment of the A. W. Brown Traveling Scholarship competition:

Benjamin Lane Smith of Chicago won the Scholarship ($2,000 for a year of study and travel abroad).

Samuel E. Homsey of Boston, second prize, $250.

William S. Morris of Albany, N. Y., third prize, $150.

William P. Kramer of Milwaukee, fourth prize, $100.

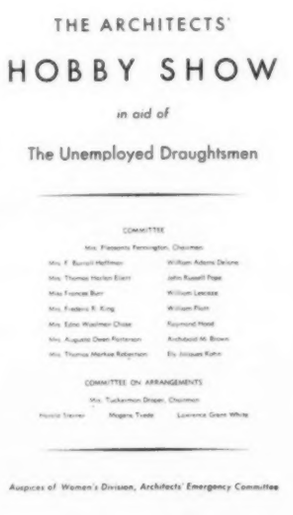
GEORGE G. BOOTH TRAVELING FELLOWSHIP

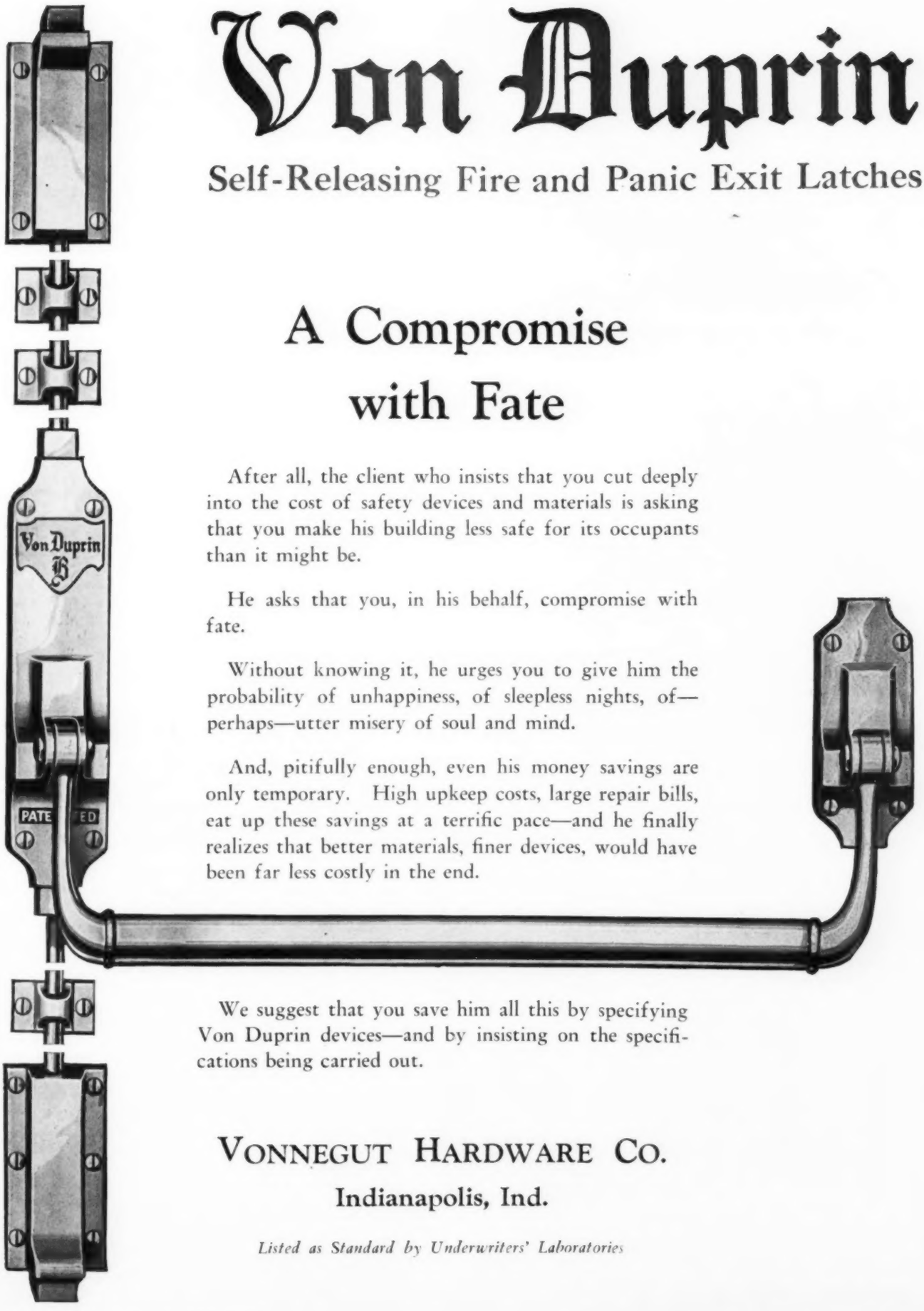
This fellowship, which carries a stipend of $1,200 and is awarded by the College of Architecture, University of Michigan, was awarded to Malcolm R. Stirton of Detroit. Earl W. Pellerin, also of Detroit, won second place, and Floyd R. Johnson, of Balboa Heights, Canal Zone, was placed third.

ARCHITECTS' HOBBY SHOW

This show was held May 25 through June 3 at Knoedler's, 14 East 57th Street, New York City, to raise funds for the Architects' Emergency Committee. From the announcement:

"The architect is America's headline contributor to the arts—a most impressive person, in terms of the world's tallest building; a gentleman of chic and distinction, when judged by the town house or the country place he has created."





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Without knowing it, he urges you to give him the probability of unhappiness, of sleepless nights, of—perhaps—utter misery of soul and mind.

And, pitifully enough, even his money savings are only temporary. High upkeep costs, large repair bills, eat up these savings at a terrific pace—and he finally realizes that better materials, finer devices, would have been far less costly in the end.

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GREENWICH, CONN., STORE OF FRANKLIN SIMON & CO.
EDWARD NECARSULMER, ARCHITECT

THE JULY ISSUE

DESIGNING and PLANNING the SMALL LIBRARY. Surprisingly little authentic and up-to-date material exists on the small library building—how it should be planned efficiently and economically. Mr. Charles G. Loring, Boston architect, has specialized in libraries and his Technical News and Research study considers a building with a shelf capacity of not more than 18,000 volumes and a ground area of not more than 3,000 square feet.

Illustrations with plans:

Brownell Memorial Library, Little Compton, R. I.
Matthews Memorial Library, Warren, Maine.
Private Library, Long Island.
Hart Free Library, Townsend, Mass.
Charles G. Loring, architect.

Echo Park Library, Los Angeles, Calif.
W. S. and Pierpont Davis, architects.

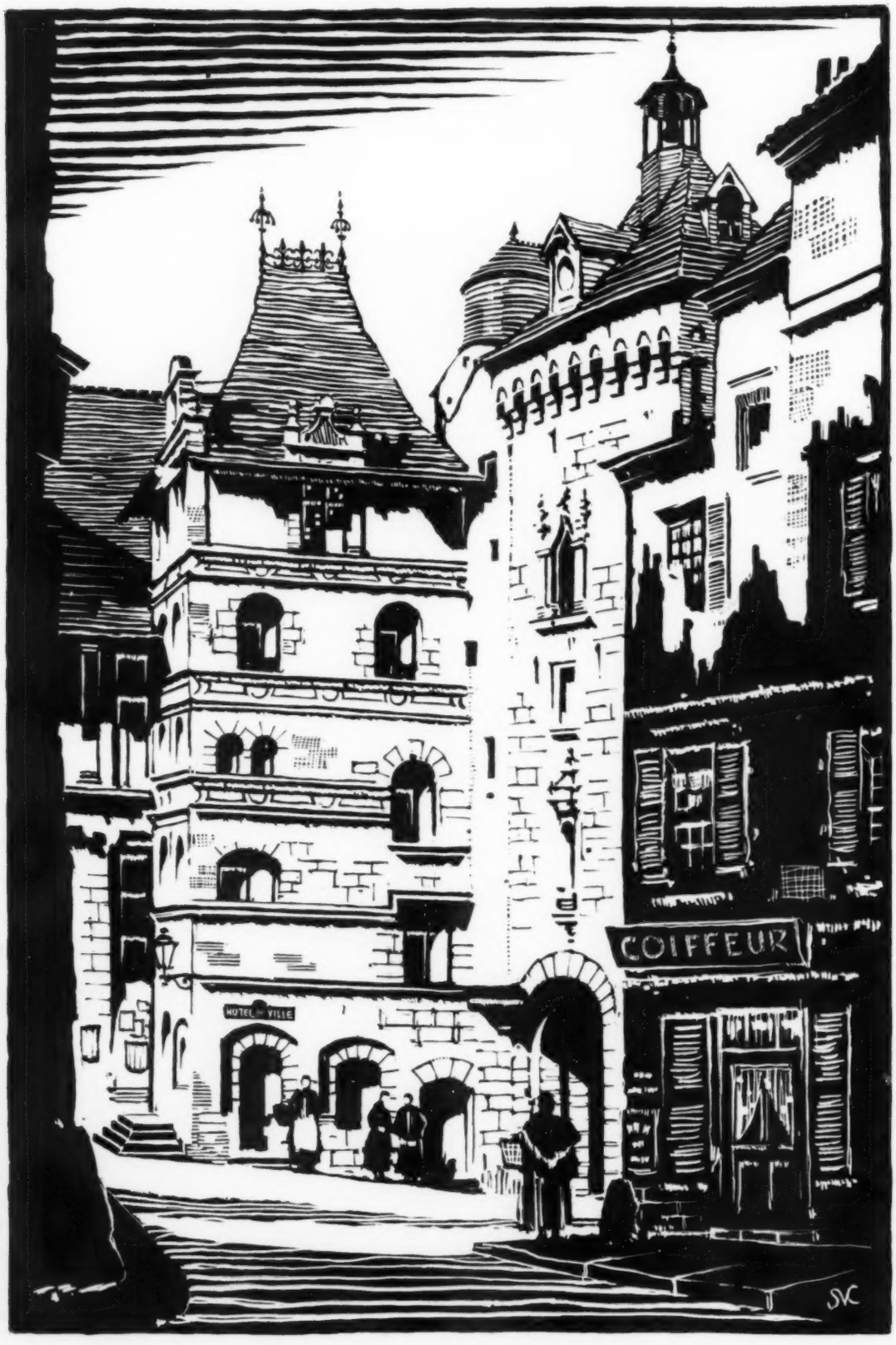
Eagle Rock Public Library, Los Angeles, Calif.
Henry C. Newton and Robert D. Murray, architects.

FEDERAL RESERVE BANK AT PITTSBURGH: A moderate-size building for banking and office utilization, designed by Walker and Weeks, architects. It has been widely commented on because of its successful combination of masonry and aluminum as exterior facing. Not only the sprandrels but also the two top stories and decorative door and window treatment are of extruded and rolled aluminum.

FIELD HOUSE for the UNIVERSITY of CHICAGO. The plan of this building, designed by Holabird and Root, architects, was determined by a study of sport requirements developed by Alonzo Stagg, Head Athletic Coach at the University of Chicago. The accompanying article is by Mr. Stagg.

PORTFOLIO OF CURRENT ARCHITECTURE: Features include a swimming pavilion by Philip B. Maher, a skating rink by Holabird and Root, a rowing club at Lake Como by G. Mantero and a bank building by Weary and Alford, together with several small houses.

DEPARTMENT STORES MOVE TO THE SUBURBS. Department and specialty stores, long established in cities, are rapidly setting up branch buildings in suburbs. These branch shops are housed in a new merchandising type of building with new special requirements. They constitute an opportunity for the architect to develop the erection of buildings for chains or supplementary shopping facilities linked to the city store. Plans as well as photographs of a fashion store building for Best and Company at East Orange, N. J., by York and Sawyer, architects, and the Franklin Simon Store Building at Greenwich, Conn., are included.



HOTEL DE VILLE AT LOCHES, FRANCE
DRAWING BY SAMUEL CHAMBERLAIN

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THE 65th CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS

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Government architecture, professional unification, slum clearance and housing, the Small House Service Bureau, and new residential tendencies were the chief subjects discussed at the A. I. A. convention, held April 27, 28 and 29 in Washington, D. C.

The report of the Committee on Economics of Site-Planning and Housing presented recommendations on which the Institute has authorized a scientific inquiry into the housing problem. This report is published in full in this issue.

The major problem of the past year under the administration of the Institute president, Robert D. Kohn, has been the Unification of the Architectural Profession and the Consolidation of the Elements of the Building Industry. The studies on the Economics of Housing and the Uses of Land, directed by Mr. Kohn and Mr. Frederick Bigger, Chairman of the Committee on Economics of Site-Planning and Housing, are encouraging efforts to discover the need for the architect and to adjust housing, and in fact all other buildings, to the requirements that are discovered by thoughtful study.

It was also made evident by the Convention that better government architecture can be produced by the "employment of architects and engineers in private practice." As pointed out by Mr. Kohn, the campaign to divert awards for government building design from the Government design bureau in the Treasury Department to the architect in private practice "was based on the valid arguments, namely, that the change would make for better architecture, for better buildings and for economy in the cost of construction. On this basis," he said, "we won the support of the profession, of the construction industry, the Chambers of Commerce and the press of the entire country. It was surely legitimate to urge that such work if spread throughout the country would relieve much distress among architects and draftsmen and speed up the award of contracts. The work of the Institute in this respect was timely, too, as an adjunct to the general move for the stabilization of employment through an increased program of Public Works."

The Unification of the Profession throughout the United States has made very apparent progress. The President's report indicates that through "joint efforts of various State Societies working with our own representatives a way has been found to bring together in a democratic fashion all of those who practice architecture, to associate them in a way which will not sacrifice that independence of action of any group within its own sphere which is so essential to advancement. At the foundation of our study is the conviction that in a true democracy the entire body of those who perform a particular function must make progress together, must raise the standards and quality of performance of all who are concerned in it if the full measure of the service is to be realized."

Institute to Direct Survey of Housing

Declaring that "the traditional, inadequately controlled, purely individualistic, and competitive process of house building in America is wasteful and productive of harmful social and economic results to the community," the American Institute of Architects has authorized a scientific inquiry into the nation's housing problems.

The inquiry will be directed "to the economic processes of community development and change so that there may be discovered, first, the unsound economic causes of blighted areas and slums, and, second, what constructive economic measures can be found to rehabilitate the blighted areas and eradicate the slum areas."

The Institute acted on the recommendations of its Committee on Economics of Site-Planning and Housing, of which Frederick Bigger of Pittsburgh is chairman. This report is published in full in this issue of THE ARCHITECTURAL RECORD. A successful effort to wipe out the slums is premised upon the correction of certain uneconomic practices which make for retrogression, a report by the Committee said.

Correction, it was held, must take the form of scientifically directed change based upon accurate, reliable data. One of the first steps is to discover and identify more exactly the anti-economic pro-

cedures involved in community development and change.

The evil social results which accompany the house building process, it was pointed out, do not directly affect those who can afford to occupy and maintain high-standard housing. Excessive subdivision of land into building lots of which vast quantities remain unoccupied was called a particularly costly handicap to the community. The purely speculative land subdivider, the committee urged, should be compelled to give way to those who carry through to final completion the whole synthetic process of land subdivision and construction of utilities and dwellings.

Architects' Small House Service Bureau

There was more expressed interest in questions arising from the Architects' Small House Service Bureau than in any other subject on the program of The Institute. Should or should not the Institute continue to sponsor the Bureau and its sale of accredited house plans at small cost?

In a spirited debate Mr. Seymour Williams of the New Jersey Chapter opposed the continuance of the Bureau under Institute relation. He pointed out the encroachment of the house plan service upon the practice of the architect, chiefly in small towns. Mr. William Stanley Parker, as spokesman for the Bureau, defended the distribution of plans at cost to those homebuilders who would not, without the existence of the Bureau, employ an architect to draw up plans and specifications. It was apparent that opposition was almost unanimous among architects of small communities where plans were sold, or likely to be sold at a price of from $25 to $35 in competition with the architects' customary charges of from 4 per cent to 10 per cent of building cost with supervision.

> The discussion terminated in a resolution that:
>
> "It is the sense of the meeting that the indorsement of The American Institute of Architects of the Small House Service Bureau be continued, with the recommendation that the services and distribution of plans be only through architects."

The method for continuing the services of The Bureau is to be worked out by the Executive Committee of the Institute.

Residential Tendencies Revolutionized

Paul Mazur of Lehman Brothers, investment bankers of New York, delivered what was, perhaps because of its timeliness, the most important address of the Convention. He advocated the adoption of the five-day week, which he said would work a change in the living habits of the American people comparable to that resulting from the advent of the automobile. This, he said, would be a most promising means of arresting "the vicious spiral of deflation."

The awakening would first be felt in the building industry, Mr. Mazur said, because the largest single deficit in the social economy occurs in home building. This deficit, measured as a recession from proven living standards of the past, Mr. Mazur estimated at $3,000,000,000.

The two-day week-end accompanying the five-day week would, he thought, revolutionize residential tendencies throughout the country, and bring about the greatest period of building this or any other country has ever seen. It would, he pointed out, cause a wholesale exodus from the cities and make the United States a nation of suburban dwellers. The resultant demand for homes, he predicted, would give a tremendous impetus to building activity. Other lines of business would then be accelerated, and a general upturn would ensue. He advocated Government credit to help the American home builder. American money, he said, had been used to finance the building of German homes and these homes will remain though the borrowers default. Illustrating the low ebb of the building industry in the United States, he said that total building operations for February of this year aggregated $15,000,000 while the loss from fire and tornado was $50,000,000.

If the Government advanced $500,000,000 through the Federal Reserve for rediscount of mortgages on new homes, the result would be to create a volume of new business in the building industry aggregating $1,200,000,000.

Previous depressions, Mr. Mazur said, have been ended by accident, of which war is the most frequent example, the introduction of the automobile being another. In 1921, besides the stimulus afforded by the automobile, there were the additional stimuli of increased exports brought about by American financing of Europe and the advance by the Government to the railroads of hundreds of millions of dollars when the railroads were returned to private control.

New Officers

Mr. Ernest J. Russell of St. Louis was elected President of the Institute as successor to Mr. Robert D. Kohn. Other officers chosen by the Institute were: First vice-president, Charles D. Maginnis, Boston; second vice-president, Horace W. Peaslee, Washington, D. C.; secretary, Frank C. Baldwin, Washington, D. C.; treasurer, Edwin Bergstrom, Los Angeles.

Mr. Russell, long prominent in the civic affairs of St. Louis, and a leader in the advancement of the profession of architecture, has been a first vice-president and director of the Institute. He organized and was for many years chairman of the National Board of Awards for Jurisdictional Disputes in the Building Industry. During the War he was Deputy Chief of Production of the Housing Division of the United States Shipping Board.

He is chairman of the City Plan Commission of St. Louis, and a former chairman of the General Council on Civic Needs of St. Louis.

ECONOMICS of SITE-PLANNING and HOUSING

This report, presented at the Institute convention, recommends that:

1. Economic forces should be recognized.
2. Anti-economic practices should be eliminated.
3. Scientific guidance is necessary.
4. Specific research should be undertaken.
5. Housing experiments should be continued.
6. Both new developments and slum eradication are necessary.

The report was prepared by the Committee on Economics of Site-Planning and Housing, headed by Frederick Bigger, chairman. Other members of the committee: Frederick L. Ackerman, G. Frank Cordner, George H. Gray, P. John Hoener, Eugene H. Klaber, C. W. Stedman, Clarence S. Stein and Henry Wright.

CONCLUSIONS AND RECOMMENDATIONS

1. Individual site-planning and housing projects cannot be considered apart from their relationship to the economic environment and financial mechanisms obtaining in the community where they are undertaken. An accurate and complete understanding of such economic factors presupposes a familiarity with the processes of community growth and change.

2. The architect should acquaint himself with the financial and other procedures characteristic of development and change in his community:

a: because his practice is materially affected by the forces operating through them, and

b. because the building industry has a vital stake in any construction or reconstruction of the community.

3. This report has been prepared so that it may be either (a) accepted as a sufficiently valid indication of the need to improve current financial and other practices, both public and private, or (b) accepted as an introduction to a more intensive and thorough study by the individual architect.

4. When fortified with the fullest possible knowledge of the economic factors, both sound and unsound, which are involved in the field of community planning, site-planning and housing, architects should cooperate with land owners, dispensers of credit, site-planners, builders, and others, in efforts to devise and construct well-planned housing projects, so safeguarded that these projects may be (a) community assets and (b) demonstrations of technical skill in the creation of high-standard housing.

5. The traditional, inadequately controlled, purely individualistic, and competitive process of house building in America is wasteful and productive of harmful social and economic results to the community. Of course, the evil social results do not *directly* affect those who can afford to occupy and maintain high-standard housing.

Excessive subdivision of land into building lots, of which vast quantities remain unoccupied, is a particularly costly handicap to the community. The purely speculative land subdivider should be compelled to give way to those who carry through to final completion the whole synthetic process of land subdivision and construction of utilities and dwellings. Attention is called to a full discussion of this idea in "Control of Land Subdivision and Building Development"—brochure, American City Planning Institute, 1928.

6. The technique of site planning and housing has already made great advances. Projects have been completed, in this country and abroad, which are invaluable demonstrations for the guidance of the architect and others in undertakings yet to be launched. Some of the projects are examples of the use of financial methods not common in this country, and from which something is to be learned by contrast with traditional American methods. Encouragement should be given to such inventiveness and ingenuity as will permit the highest type of design and construction that is attainable under the existing financial set-up or under any modified financial procedures which may be initiated.

7. At the present time, and probably for many years to come, the methods of "large-scale operation" will produce the maximum financial economy, the most efficient planning, and the most extensive provision of amenities and social goods. (See report of Committee on Large-Scale Operations of the President's Conference on Home Building and Home Ownership, December, 1931.) The greatest protection of housing developments against physical, economic, and social deterioration will be obtained, in most cases, through some form of unified or collective ownership of housing projects.

8 However great the accomplishment of new high-standard housing in new localities through skillful site-planning, large-scale operations, or advanced technological process, the problem of slum elimination and the rehabilitation of blighted areas remains and cannot be ignored. It is a part of the whole picture. These retrograde dwellings and disintegrating neighborhoods are an economic

drag upon community improvements, particularly upon new housing ventures. Therefore, the substitution of high-standard housing for degenerating and low-standard housing must be accepted as a major objective of both social and economic importance. It is scarcely necessary to point out that the elimination of the slum will offer special opportunities to the architectural profession and the building industry.

9. A successful effort to eradicate the slum is promised upon the correction of certain un-economic practices which make for retrogression. Such correction must take the form of scientifically directed change based upon accurate, reliable data. Constructive steps can be taken immediately. One of the first steps is to discover and identify more exactly the anti-economic procedures involved in community development and change. To this end, a scientific inquiry has been proposed to an important Foundation by this Committee with the indorsement of the Board of Directors of the Institute.

It is recommended that the American Institute of Architects, in Convention assembled, indorse the proposal of the Committee on Economics of Site-Planning and Housing and the Board of Directors of the Institute: that a scientific inquiry be directed to the economic processes of community development and change so that there may be discovered, first, the unsound economic causes of blighted areas and slums and, second, what constructive economic measures can be found to rehabilitate the blighted areas and eradicate the slum areas.

SIX MAJOR PHENOMENA OF COMMUNITY DEVELOPMENT AND CHANGE

1. Impaired Financial Condition of Local Governments

Many municipalities are in a weak, if not actually precarious, financial condition. A few, perhaps, are on the verge of bankruptcy. The pyramiding of municipal debt is a well-known operation. Public attention is usually directed to this condition in the larger urban centers. Less is known of the financial condition of county units or of satellite regional units which surround the urban center, although the financial condition of these environmental localities would appear to have considerable importance because of their character as the economic hinterland of the metropolitan center.

2. Public Credit for Complete High-Standard Services Inadequate

Municipal credit is obviously inadequate to supply all residents of a city or an urban region with completely developed streets and utilities of the type considered desirable, if not actually essential, for modern American communities. Beyond these, only a few more forward-looking and fortunate communities have attempted to provide, with any adequacy, those parks, playgrounds, and other recreational areas which become increasingly necessary as buildings crowd together and occupy more and more of the once vacant private land.

3. Public and Private Credit Impotent to Prevent or Rehabilitate Sub-Standard Housing or to Substitute High-Standard Housing

Local governments lack the financial and legal capacity to cope with and to stop the depreciation and obsolescence of large areas of housing. They are now unable to rehabilitate such districts at public expense; they cannot encourage rehabilitation at private expense without an excessive expenditure of public money for so-called "public improvements" which might revitalize the blighted or slum areas. Public credit and private credit alike have been impotent to scrap the blighted areas and slums, or to substitute for them a social and economic asset in the form of less crowded and more scientifically planned modern housing developments.

4. Retarded Population Growth and Shifting of Population

The Census of 1930 reveals: (1) a marked retardation of total population growth, and (2) an increased flow of population from congested urban centers, coupled with a diminishing flow toward them. This is a startling reversal of the traditional population trends and movements to which America has become accustomed. The Census also indicates more radical shifts of population within the corporate limits of cities than was common in earlier periods, a rapid desertion of certain areas with a corresponding intensification of occupancy in others. These phenomena disclose a progressive and increasingly rapid relinquishment of older housing to the influences which make for retrogression in social and economic value.

5. Reduction and Change of Building Demand

Closely related to the foregoing item, and perhaps properly a part of it, are the appraisals already made of the probable effect of this slowing up of total national population growth and of the redistribution of population. Among these appraisals one may be especially cited—that prepared by Thomas S. Holden, Vice President in Charge of Statistics and Research, F. W. Dodge Corporation ("Effect of Reduced Population Growth on

Construction Demand"—Architectural Record, General Building Contractor, January, 1932). Mr. Holden's calculations and tables merit study. Comparison is made between construction by "existing" (stabilized or static) population and construction which can be assumed to arise out of demands of new population. One significant calculation indicates "that existing population would have to increase its expenditure 25 per cent over the last decade to equalize the anticipated decline in construction for new population. To reach such a scale of increased construction expenditures, the existing population of this decade will either have to have a much larger national income than in the past one or allocate a larger portion of the same-sized income to construction."

Quoting further from the same analysis: "The many factors that may affect the declining tendency rate of population growth may be grouped under four headings, as follows:

"1. More per capita expenditures for construction.
"2. Changing composition and distribution of population.
"3. Rapid obsolescence of buildings.
"4. Economic planning of construction activities.

" . . . It will appear that while the first three factors will tend to influence the situation, their influence is likely to wane rather than increase in the long run, and that more and more we shall have to rely upon economic planning as we develop a sound program and a sound technique."

Mr. Holden believes there will be less and less opportunity for speculative real estate and building development; he thinks "the building industry will of necessity develop a sound economic plan."

6. Architects' Participation in Building Operations

Architects have never enjoyed more than a minor quantitative participation in the designing and planning of this country's total building construction. During the past few years even that small share has been curtailed. Others may undertake, if they will, to explain why trained professional and technological skill has not been drawn upon more largely, particularly in the housing of the moderate and lower income groups of the population. Certainly one of the basic reasons, if not actually the primary one, has been the speculative builder's preoccupation with his dominant objectives of sales and quick profit. For other builders the pressure of financial procedure has made it seem impossible to include in their calculations an item for an architectural fee.

The allocations of housing expenditure among various types of dwelling and in different price ranges are interestingly recorded, with other valuable information, by Robert Whitten in the third volume of Harvard City Planning Studies, "Neighborhoods of Small Homes" (by Robert Whitten and Thomas Adams). This volume is recommended to the attention of architects.

LOOKING FURTHER FOR CLUES

If the major phenomena of community development and change are examined further with their inter-relationships in mind, more can be understood of the machinery we have used and of the manner in which it works. Although it is obvious that there have been unsound economic practices in operation, it is desirable to discover and identify them more exactly, and to learn what has caused them to persist. This is particularly true with respect to their influence upon the building industry, and with respect to the part they play in preventing the creation and maintenance of permanently safeguarded housing of a high standard.

The Committee on Economics of Site-Planning and Housing is not equipped now to undertake a scientific inquiry of the kind necessary to evaluate, in an adequate manner, the related financial and economic factors. It is not yet prepared to appraise the merit of any modifications of present practices which have been suggested, however promising they now appear. Therefore, with the indorsement of the Board of Directors of the Institute, a program of scientific economic research has been proposed to an important Foundation. (No recommendation was made concerning the agency by which the inquiry should be conducted.) Meantime, pending the approval or rejection of that proposal, the following further elaboration of the general picture is essayed.

Effect of Competitive Developments

In America the housing and re-housing of the vast majority of the population has been a competitive process. The results are apparent. Wherever superior housing becomes available to any particular economic class, the former dwellings of that class are vacated and are either (a) replaced by the superior or more modern type of housing, or (b) occupied by people of a lower income group. The first kind of change is usually not extensive. The second and prevalent kind of change affects more people, since it involves the successive moving up of each class of income group into the housing made vacant by the next higher income group. This process makes for shifting residential population. It leaves at the bottom an increasing number of obsolescent, depreciated, and actually decrepit properties which collectively become slums.

Unless our none too strict health and housing laws are so enforced as to compel demolition of substandard dwellings, the latter remain as income-producing properties. Our communities, generally, have been unable or unwilling, or both, to prevent wholesale retrogression. It is now becoming clearer that there is an economic as well as a social objective in eradicating the slum.

The normal trend from bad housing to good, and from good to something better, is broken periodically when local or general depression compels many families to surrender their dwellings for less desirable ones or to share them with others. This makes for doubling and over-crowding. It is a lowering of the standard of living with all that that implies. Many dwellings, old and new, remain vacant during the depression, and this condition gives rise to the opinion that there is an excess rather than a dearth of housing, a mischievous notion which tends to encourage neglect of existing dwellings and to discourage the erection of new ones. The actual situation, when analyzed in the light of an observable drop in living standards, reveals that there is an excess of inferior dwellings, a lack of social control to prevent over-crowding and the occupancy of undesirable structures, and a real shortage of good houses.

In the trend toward better housing—accelerated in prosperity and halted or reversed in times of depression—the dominant factor is not the well-being of the people who are housed, it is the pressure exerted by our peculiar financial procedure and its sanction—profit. This is buttressed by unwieldy and antiquated legalities which are obviously unsound from an economic point of view. The validity of the statement is not affected by the fact that there may be other causal forces—not primarily economic in character—such, for example, as the concentration of racial or social groups in particular localities, segregation or isolation induced by topographic conditions, and the like.

Pressure of Financial Factors

The pressure of financial factors affecting housing (and building generally) compels an unremitting search for economies in planning and construction. A problem is placed upon ingenuity as an aid in "beating the game" which is so inflexibly fixed by the financial set-up. Among the results of such effort are increasing skill in site-planning, in the grouping of buildings, and in the creation of more adequate and appropriately designed open spaces.

Less effort, or less successful effort, has been directed to the search for a way to escape the maladjustments which our traditional practices involve. As a matter of fact, the thing we should be looking for is better and more equitable adjustment between two things which now pull in opposite directions. They are, on the one hand, the interest and aim of the private property owner; and, on the other hand, the interest and aim of the collective group of private property owners who make up a dominant part of the community and whose collective action is exercised by their chosen public officials. Whether the private owner of property be an owner-occupant of a dwelling or a landlord, he is dominated by the profit motive, i. e., when his property is for rent or for sale he welcomes the placement of a maximum financial value upon it. His wealth is calculated with the objective in mind; his bookkeeping, if he has any, is based upon it. He objects to increased taxation, but he desires the improvements, at public expense, which promise to make his property more valuable. Acting collectively with his fellows, through public officials, he finds that he has to pay outrageous prices for the land or buildings that must be taken from John Doe or Richard Roe to make way for a public improvement. Still acting collectively, he finds it too costly to buy the private property necessary for the recreation of his children, as a substitute for the private yard play space that has been covered over by "more profitable" buildings.

The question to which we must find the answer is: What is the best balance to establish between the financial objective of the citizen as a private owner and the financial objective of the citizen as a community partner? Other questions follow: What should be the legal relationship between the detached individual and the individual as a community partner? Should a single property be utilized to gouge an excessive profit out of other properties? Are all private property owners entitled to make the same rate of profit at the expense of all the other private properties? What rate of profit should be permitted to John Doe? More than to Richard Roe? How much more? Why? What should be the relation of one man's land or building to the common land and facilities which he and his fellow citizens set aside to serve everybody? Are all these questions purely academic ones? Well, let us see.

When a costly street widening has been made, the municipal real estate assessor raises the "assessed valuation" of the abutting property. Taxes are then based on that higher valuation. Faced with these higher taxes, the private property owner raises the rentals of his building or he builds a more remunerative building. In the latter case he quickly tends to cover all his land (often unwisely, because he overlooks the economic value of permanently preserved open spaces for light and air and appearance). If all the more bulky buildings accommodate a larger number of people, if the temporarily stimulated business concerns attract more people to that street, a still more ample thoroughfare will be advocated. Improved public transportation facilities may be asked for, ostensibly to carry people away from the congested street, but just as certainly to return the profitable crowd the next day. But, meantime, the land and buildings which the municipality must acquire for any new widening of the street have become very valuable! Then comes the final plea: that the

cost of what is advocated will be repaid to the municipal treasury within a short time, because the new values that are to be created will enable the property owners to pay increased taxes.

This, then, is the sequence, and these are the expanding cycles: (A-1) a public improvement; (A-2) higher property values; (A-3) higher taxes; (A-4) more bulky buildings, more intensive use of private property; (A-5) more people and vehicles in the street; (A-6) demand for "relief from congestion"; (A-7) specific proposals for new public improvements; (B-1) new improvements at public expense; (B-2) increased property values; (B-3) still higher taxes; (B-4) still more intensive use of private property; (B-5) still more "congestion" of people and vehicles in the street; (B-6) demands for still more "relief from congestion"; (B-7) new schemes proposed to increase values; (C-1) another publicly financed improvement program; and . . . so . . . on! All through this vicious spiral the public treasury never comes out ahead, its credit becomes pledged to the limit; some property owners are more or less constantly "on the make," other owners have nothing done to help their own properties the while they contribute taxes toward this effort to increase the favored owners' property values. Is it any wonder that financial processes so inequitable and absurd should make congestion profitable to some, and to that extent desirable—or that the municipality and its neglected parts should be led into bankruptcy?

Public Maintenance of Depreciated Housing Areas

Public facilities—streets, sewers, water, lights, etc.—which serve the blighted area and the slum, have to be maintained, after a fashion at least, by public funds. They may, or may not, have been adequate when first supplied; but they are almost certain to be neglected after decline has set in, thus accelerating retrogression. If, however, standard maintenance of these facilities should be continued, either the tax contribution of depreciated properties is less than the cost of the services they enjoy, or they must be over-crowded to produce sufficient revenue to meet such a charge. Whether or not the blighted area and the slum pay for their own facilities, it is a theoretical fiction that they contribute their proper quota toward the provision of facilities for other and higher-standard localities, perhaps even for those new ones in which modern housing is set up to compete with them. It is nonsense to pretend that retrograde areas are anything but an economic and social burden to the community of which they are a part. Is there an alternative to saddling high-standard housing and nonresidential properties with the cost of maintaining even inferior public services for blighted areas and slums which cannot pay for them?

The municipality *owns* as well as operates the public facilities in moribund districts.* If it neglects them it suffers loss on capital-equipment and by inefficient operation. If it maintains them at standard, it mulcts its economically healthy districts to pay the cost, and delays the abolition of blighted areas and slums, thereby encouraging the creation of new areas to meet the demand for good housing—a procedure which entails extensive outlays for new capital-equipment—streets, water lines, sewers, police and fire protection, schools, parks, playgrounds, and the like. In effect the municipality does two ridiculously contradictory things, i.e., it preserves a dangerous and costly pathological condition and at the same time attempts to compensate for it by vast expenditures for new projects. It is as if a mad physician were to administer poison and antidote, toxin and anti-toxin, in concurrent doses.

Clearly, the continuance of sub-standard housing in the urban picture is a principal cause of new housing developments which force the community to expand over wider territory, to become physically difficult to administer, costly to repair, and extravagant to operate. In these trends, with their unsound economic basis and the dubious financial and legal procedures which they involve, is to be found the obvious explanation of the disconcerting fact that the larger the community, the greater the per capita cost of operating it.

Valuation and Taxation

Official appraisals of property are attempts to evaluate real estate as a basis for determining the share of community costs which the individual owners must bear. In this country, valuations on private property—whether fair or otherwise—are constantly challenged by owners. The appraisal technique is clumsy in its efforts to differentiate between residential and other types of real property. Ordinarily, no account is taken of the important distinction which ought to be made between housing occupied solely by the owner with saving to himself, and rented housing which exists only as a commercial, profit-making commodity. This tends to throw owner-occupied property into the speculative field, and tempts the owner to surrender the "social home values" for the lure of pecuniary profit. Moreover, since the assessed valuation is designed to represent all, or a fixed proportion, of a property's *market value*, the procedure is awkward and misleading. All properties are appraised at the same time—*as if they were for sale individually; and simultaneously;* but if the latter were actually so, there would be so great an excess in supply that valuations would have to be lowered almost to zero.

More attention should be given to the processes of evaluation and assessment, both of which are financial procedures fundamentally involved in the housing problem. Inequalities and inconsistencies in real estate evaluation and taxation have been cited by proponents of various taxation programs

*The operation of public utility companies which may render some of these services may be ignored for the purposes of the present discussion, as that fact does not destroy the validity of the general picture.

—higher income levies, taxes on machinery or manufacturing, taxes on business, the sales tax, and taxes on land values only (Single Tax), for example—as arguments for their particular creeds. It is rather curious, however, that few if any tax reform advocates have coupled with their proposals provision for (a) some principle to be applied to the differentiation of land as to its value and its most appropriate use, or (b) a specific mode of control in the manner and intent of building upon land.

Moreover, there seems to have been little concern to discover a principle of valuation which would be more rational and economically sound than the currently accepted rule of thumb criterion—"market value."

Divergent Ownership and Objectives

In any community the private properties might be classified in terms of their divergent social and economic use, thus:

A-1. Residential property occupied solely by the owner as a home;

A-2. Residential property cooperatively owned and occupied as dwellings;

A-3. Residential property whose owner rents it for pecuniary profit;

B-1. Business or industrial property occupied by the owners for the purpose of conducting profitable business or manufacturing operations;

B-2. Business (or industrial, if any) property collectively owned and occupied by the owners for the purpose of conducting profitable business or professional practice;

B-3. Business or industrial property whose owner rents it for pecuniary profit (office buildings, for example).

It is important, also, to discriminate between the holder of a single, small property and the holder of large properties. Both feel the burden of direct taxation, it is true; but the increase of these burdens tends to eliminate the small property holder as a payer of direct taxes on real estate. This is apparent in the increasing number of such small holdings which the municipality must expropriate for non-payment of taxes. There are, of course, many other financial difficulties which may force the small property owner out of the housing picture; but the point is that, in instances of tax delinquency, it is the community itself which has eliminated the home owner and made more tenuous his tax-paying participation in the public business and the communal partnership.

Housing Experiments

Out of the movement called "housing reform," purely ethical and social in its inception, there have come practical experiments in providing better housing. On an improved financial basis some progress has been made—notably in London—in the rehabilitation of slum areas. In America, thus far, attempts at radical abolition of slum areas have scarcely progressed beyond the stage of fond desire.

The most outstanding housing experiments are of two general types: (a) individual or groups of individual dwellings, outside of or in the outer parts of urban communities, and upon low-priced land; (b) multiple dwellings, especially the "garden apartment" type, where higher land and building costs coupled with less land coverage are compensated for, financially, by intensive occupancy.

Within the very definite limitations of a rigidly financial but economically unbalanced set-up, great advances have been made in the technique of site-planning and housing. The garden communities and some of the urban housing of continental Europe and Great Britain, together with outstanding experiments in this country, give ample evidence of what technological skill can accomplish. Some of them demonstrate further possibilities of accomplishment when traditional financial pressures are relaxed. The social and economic value of these experiments will not be underestimated. They will be object lessons of increasing value to real estate developers, architects, builders, and the dispensers of credit. Nevertheless it is true in this country, and largely true in Europe (outside Russia*), that these modern housing demonstrations are isolated and relatively small cases of high-standard dwellings surrounded by, and subject to the hazardous influence of, environments of inferior stability and disintegrating economic and social tendencies.

The last statement must not be misunderstood. This Committee is far from calling such experiments futile. Inventiveness and ingenuity are not to be discouraged. The Committee merely points out that these advanced experiments are only a part of the picture—and that there are more basic adjustments to be studied which have a larger significance than attempts to "beat the game."

Development of Site

Modern and efficient site-planning has demonstrated the value of skillful technique in adjusting grades, layout of surface roadways and sub-surface utilities, etc., in relation to the number, grouping, and character of the dwellings. There appears a clear divergence between the types of site-plan best suited to a centrally-owned housing development for rent, and those types which lend themselves to the separate ownership of lot-and-house property. Mr. Henry Wright's studies have clearly indicated this difference. They show that the maximum financial economy, the most efficient planning, and the greatest neighborhood protection are thus

*Germany and Holland are not included in this exception because, although outstanding in their record of accomplishments, they retain private property and much of their older housing is on the down grade.

far obtainable when large-scale operations are involved, and when the ownership is centralized or cooperative. On the other hand, the projects designed to permit individual dwelling ownership cannot be designed with the same financial and other economies. They tend to impose a greater cost of maintenance upon the local government; and they have a more limited, and often precarious, protection against undesirable change, because of the diverse economic and civic points of view of individualistic owners. Mr. Wright has warned the planning copyists against appropriating plan forms suitable for the centralized or collective ownership schemes—particularly if, prior to the sale of individual properties, all of the dwellings and all of the utilities and services are not to be completely finished.

In parts of congested urban areas, site-planning development has been principally concerned with the relation of multiple-family dwellings to the surrounding and inclosed open spaces (courts). This type of project has evolved into what we call the "garden apartment." Skillful as the planning of these actual buildings may have been, and however excellent the design of the exterior of the buildings, the first challenge to our attention might justifiably be the amount of open space that has been preserved, and how it has been possible to preserve it.

LOOKING AHEAD

Adjusting the Community to the Machine

There are those who say the machine should be adjusted to the community and not the community to the machine. To this nebulous pious wish the committee subscribes—at least in part. If the present financial procedure constitutes a machine, it is submitted that the machine is not based on modern conceptions of efficiency, that it is badly in need of improvement. However, there are products of the machine age which appear desirable and have to be accommodated, notably the automobile. Hence the demand for the creation of efficient channels for the main streams of vehicular movement. If we eliminate the economically unsound financial practices now current in the community picture and thus relieve some of the undesirable pressures and influences, it is more than likely that the creation of entirely adequate traffic channels will be a much less difficult task than it now appears to be. Then it will be possible to have the community network of traffic ways more scientifically adjusted to the needs of the private properties they are supposed to serve. As long as the current irrational practices obtain, all our theoretically efficient major street plans are beyond our financial ability to pay for. All the more ideal schemes for a proper distribution and development of public recreation areas are likewise beyond our financial capacity to effect. Under the present unmodified set-up, the necessity to effect public economies will compel most communities to curtail radically the ambitious scope of the plans that have been made to guide future community development and change. We shall always need to know, and to constantly re-appraise, the community's requirements, giving attention both to the constructive contribution of motor transportation and to the vital need for scrapping the slum, for rehabilitating the blighted area, and for the production of more stabilized and higher-standard housing.

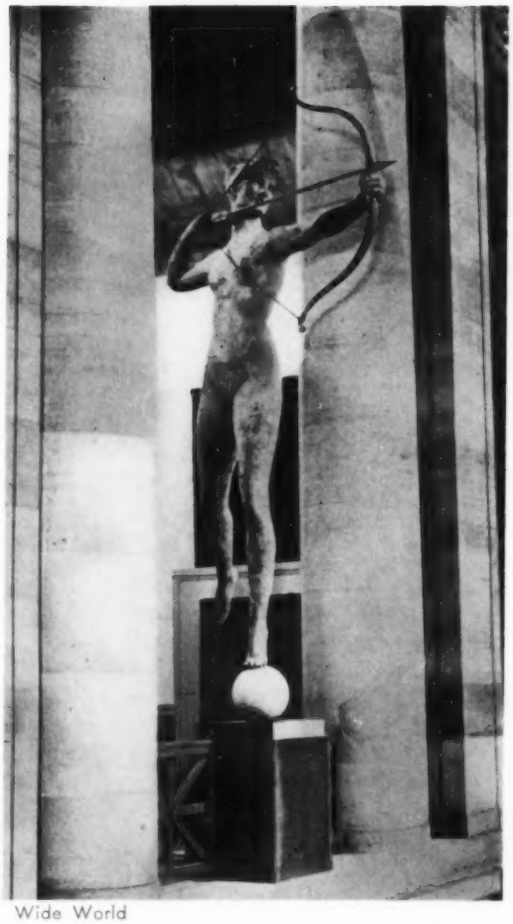
Meantime, we must not forget that there are larger ramifications of the threads of the economic fabric than those mentioned in this report. If the whole quantity-production basis of much of our modern life is radically modified, as some prophesy, we shall, of course, have to accommodate ourselves to that.

The Political Method

Political procedure is the principal too with which we shall have to work. That procedure is essentially one of compromise—compromise which is now pathetically ignorant of the significance of economic realities. Our political procedure must become saturated with sounder economic understanding; and that understanding must be acquired by the architect as well as by others. Once such understanding is acquired, those compromises which are inherent in our republican political methods need not be so hazardous to real progress as they often are now. Recognizing this, the Committee on Economics of Site-Planning and Housing does not like to contemplate attempts to correct present obvious maladjustments by purely expedient, emotionally unstable, or too rapidly revolutionary processes. The alternative, of course, is to proceed under scientific direction. Hence the effort in this report to picture the field with which the architect will have to deal.

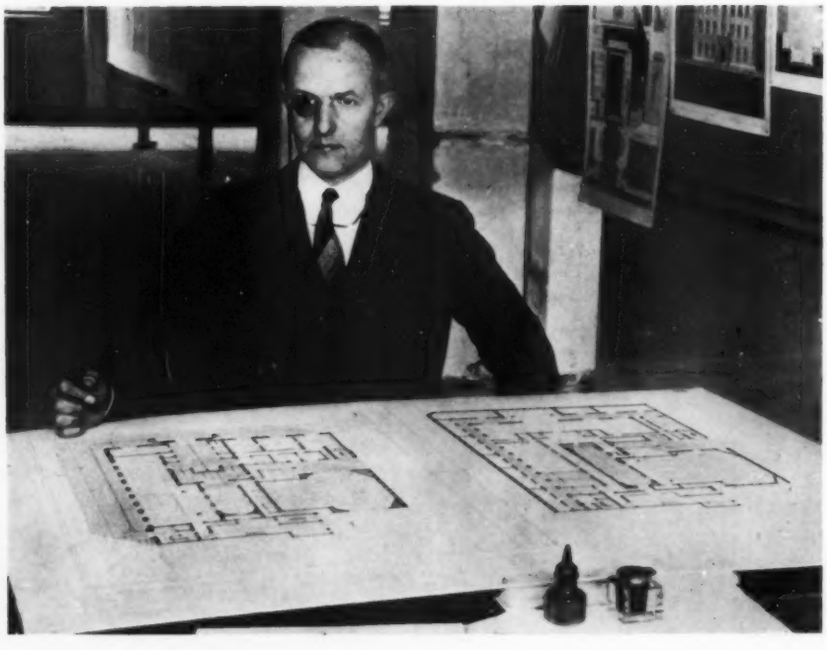
ILLUSTRATED NEWS

New Building for R. I. B. A.



Wide World

DIANA OF MADISON SQUARE by Augustus Saint-Gaudens, now in the Pennsylvania Museum of Fine Arts. This statue topped the campanile of the old Madison Square Garden. It was preserved after the demolition of this building.

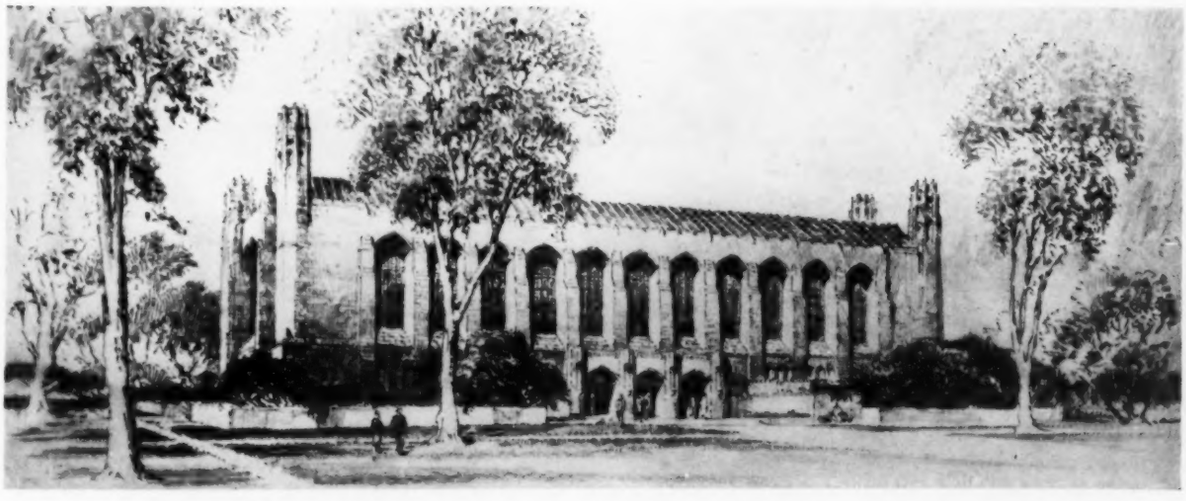


NEW BUILDING FOR THE ROYAL INSTITUTE OF BRITISH ARCHITECTS. A new headquarters building for the R. I. B. A. was the subject of a national British competition, in which the architect Grey Wornum was awarded £500 and given the commission for the building. The site is Portland Place, in the west end of London leading from Regents Park to famous thoroughfare of Regent Street. There is a meeting room for the Institute and exhibition halls that are equally accessible to the public from the main entrance. There are also offices, a banquet room, a council dining room, libraries and committee rooms.

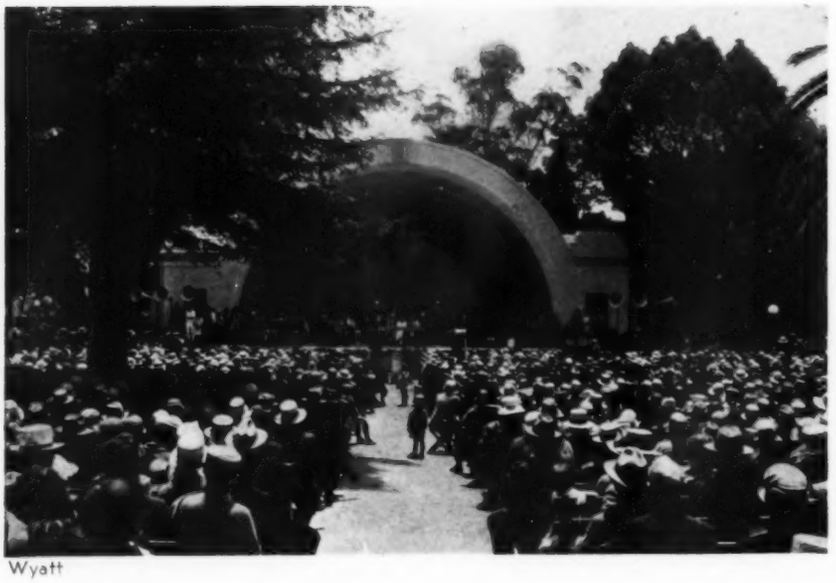
HUTCHINSON MEMORIAL BUILDING, Tulane University, New Orleans, for the Medical Department of the University. Favrot and Livaudais, architects.

UNDERGROUND PARKING GARAGES IN BUENOS AIRES. This scheme for two-tier auto parking, by the architects Stok and Stok, is intended to solve the street congestion problem in the city of Buenos Aires. These garages are planned to be built under the six central squares of the city, forming a net which encloses the most congested area.

SHEBOYGAN HOSPITAL, Sheboygan, Michigan. Schmidt, Garden and Erikson, architects, E. A. Stubenrauch, associate architect.



CHARLES DEERING MEMORIAL LIBRARY, Evanston, Illinois. James Gamble Rogers, Inc., architects.

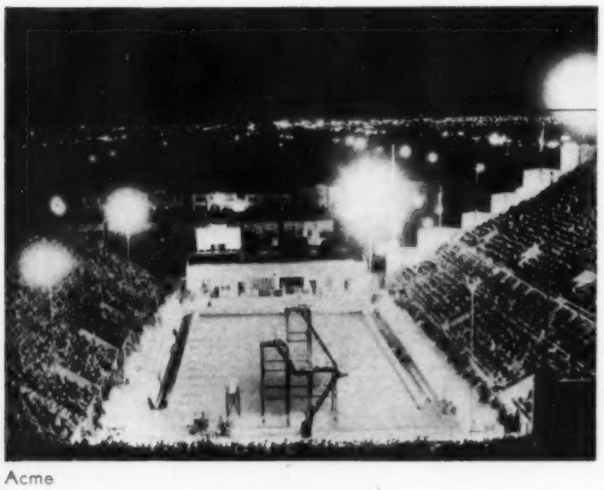


Wyatt

NEW MUSIC SHELL IN PASADENA recently completed from a design obtained in a competition conducted by the Pasadena Architectural Club. The auditorium in front of the shell accommodates 3,000 persons and is laid out in a manner similar to an indoor theater with sloped seating area and aisles.

Keystone-Underwood

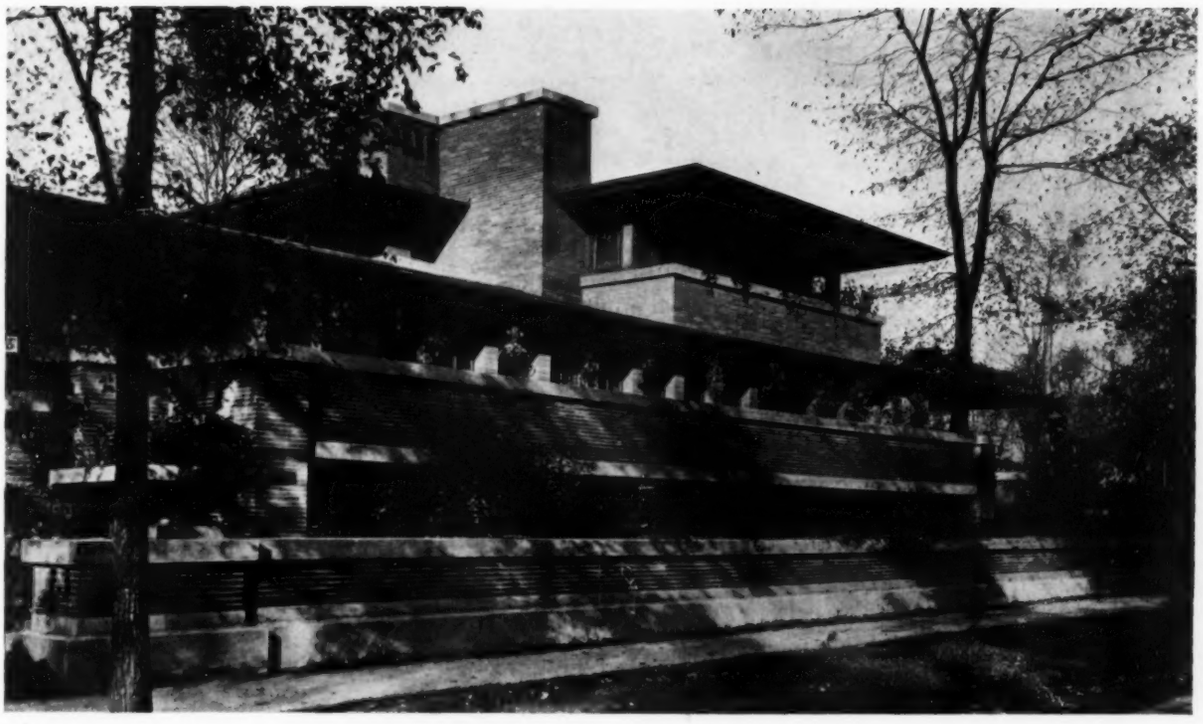
MOVIE THEATER ON WHEELS. A portable movie theater with complete talking and projecting apparatus has just been completed in Los Angeles.



Acme

STADIUM FOR WATER SPORTS, erected for the Olympic games in Los Angeles. Ten thousand persons were accommodated in the stands at the dedication.

CLOVER LEAF HIGHWAY INTERSECTION near Woodbridge, New Jersey, by New Jersey State Highway Commission. A traffic crossing without traffic lights.



A CHICAGO HOUSE DESIGNED BY FRANK LLOYD WRIGHT IN 1908

BUILDER AND POET—FRANK LLOYD WRIGHT

By FISKE KIMBALL

To understand Frank Lloyd Wright, whose own effort at self-understanding now lies before us in his *Autobiography**, we must turn to the writers of another period of storm and stress—the great German thinkers who divined the nature of poetic or artistic creation, and who themselves so deeply influenced Wright and, before him, Louis Sullivan.

It was in the later eighteenth century that reaction against an exclusive worship of reason led Klopstock to realize that "true poetry must spring from the deeply agitated heart, in order to stir the hearts of men." Thus arose with Herder the conception of the genius, who by the totality of his faculties, by his senses, his feelings, imagination and reason, could draw upon the primal sources of nature and humanity to bring forth creative works of deep originality, akin to those of nature herself. "The poetic genius," wrote Goethe, "became fully aware of himself and, conscious of his dignity, would create the conditions of his existence independently and thus found a new epoch of intellectual life."

"To create the conditions of his existence independently," that indeed has been the striving of Frank Lloyd Wright, giving unity to his work, to his life. Personality is one; the work and life cannot be separated. "To create the conditions of his existence independently": that makes us understand the building, at twenty-one, of Wright's own first house at Oak Park, the genesis of Taliesin, at once home and workshop; its tenacious rebuilding after tragedy and calamity; the creation of the Tokio studio, of the desert camp, Ocatilla. More deeply, it makes us understand the loyalties underlying the struggle for freedom in life by "this unconventional believer in the Good, the True, the Beautiful, as work and life and love."

One condition of his existence, indeed, he could not control or escape: the heritage of pioneer independence, the heredity of the protestant, the rebel, and the preacher. But it led him to rebel against the very heritage itself in its sterner Mosaic aspects, to demand that beauty should be admitted as well as truth. Society too has been loath to permit him independent control of the conditions of personal existence, and has imposed its penalty, not only on him, but on itself by the loss of many a work.

"To arrest and typify in materials the harmonious and interblended rhythms of nature and humanity," that is how Sullivan, Wright's "beloved Master," expressed the task of architecture—which Wright himself once called "the Idea of the thing —made to sing to heaven." With what freshness of intuition Wright seized on the idea or essence

* Longmans, Green and Company, 1932. 8° 371 pp., Illus. $6.

of the thing in each work he attacked, his book, like his work, bears ample witness. The early houses, in their articulated union of the elements of use, in their harmonious outgrowth of the site, in their multiplied planes, their energized gathering of pier and opening—the Larkin Building, in its humanization of mechanized business, its richly plastic embodiment—the Unity Temple, with use and form so genially fused—the joyous exuberant phantasy of abstract geometric elements in the Midway Gardens—the elemental clarity and simplicity of the National Life Insurance Building—the infinite significant variety of so many other buildings—all these leave us astounded at the imaginative penetration of practical and ideal requirements, flowering in organic form.

"To typify *in materials*," Sullivan had said—but here it was Wright who was to practice what Sullivan had preached. "As to relying on them for beauties of their own," says Wright, "he had no need, no patience. All materials were stuff to bear the stamp of his imagination and bear it they did—cast iron, wrought iron, marble, plaster, concrete, wood pretty much alike . . . his sensuous ornament . . . his own . . . so lovely a smile evoked by love of Beauty." To Wright the thought of materials is primary and instinctive—the design takes form only in an appropriate material, which itself suggests both structure and pattern. And what a fertility of suggestion and invention!—monolithic, form-cast concrete; concrete cast in permanent forms; the reinforced cantilevered slab-roof; poised cantilevered floors with wall-curtain of glass, copper, and insulation; the woven block-construction. No limited canon: "Stick. Stone. Steel. Pottery. Concrete. Glass. Yes, pulp, too, as well as pigment." "Inventing new construction to make itself beautiful as architecture." We cannot, to be sure, agree with Wright in believing that "there never was, there is no architecture otherwise"—in rejecting the great plastic or even sculptural styles which have no constructive basis. But that construction itself can be made to sing we have the work of Wright and of the Gothic architects to prove.

First, perhaps anywhere in the world, to welcome "The Art and Craft of the Machine" as the tool of a craftsmanship not confined to "handicraft," Wright, we see, does not allow the machine age to demand the rejection of all but machine products: "the ideal does *not* require that buildings must be of steel, concrete, or glass . . . Nor does it even imply that mass is no longer beautiful attribute of masonry materials genuinely used. We are entitled to vast variety in our buildings in our complex age." Sullivan sought "the rule so broad as to admit no exceptions," his reasonings tended to confine his imagination, wrongly, within "types" he himself had first created as individual intuitions. Wright says "For the life of me I could not help, then or now, being interested in the exception as proving any rule both useful and useless." "Consistency? It is seldom the word for the imaginative mind in action." Thus he rejects every demand for a new "style" or "unity of style," to be held in common by the architects of our day and conceived as to be valid also for the future": . . . "the sentimentality that tries to hold life by 'institution' and establishment—are they not all punishment for violation of the first simple law of Freedom: the law of organic change."

One may object that all this is merely the view of a period—a bygone period—of romanticism, individualism. Alas, for such an objection: if we know anything of philosophy it is that individualism is rooted in the very nature of art itself. What is deeply true of art—which, in the midst of our practical problems, we as architects all believe fundamentally we are practicing—is that individual creation is of its essence. What distinguishes it from science, which seeks universal laws and universal forms, is that art seeks individual forms, each differing in its synthesis from every other, each constituting a new unit in the possessions of the world.

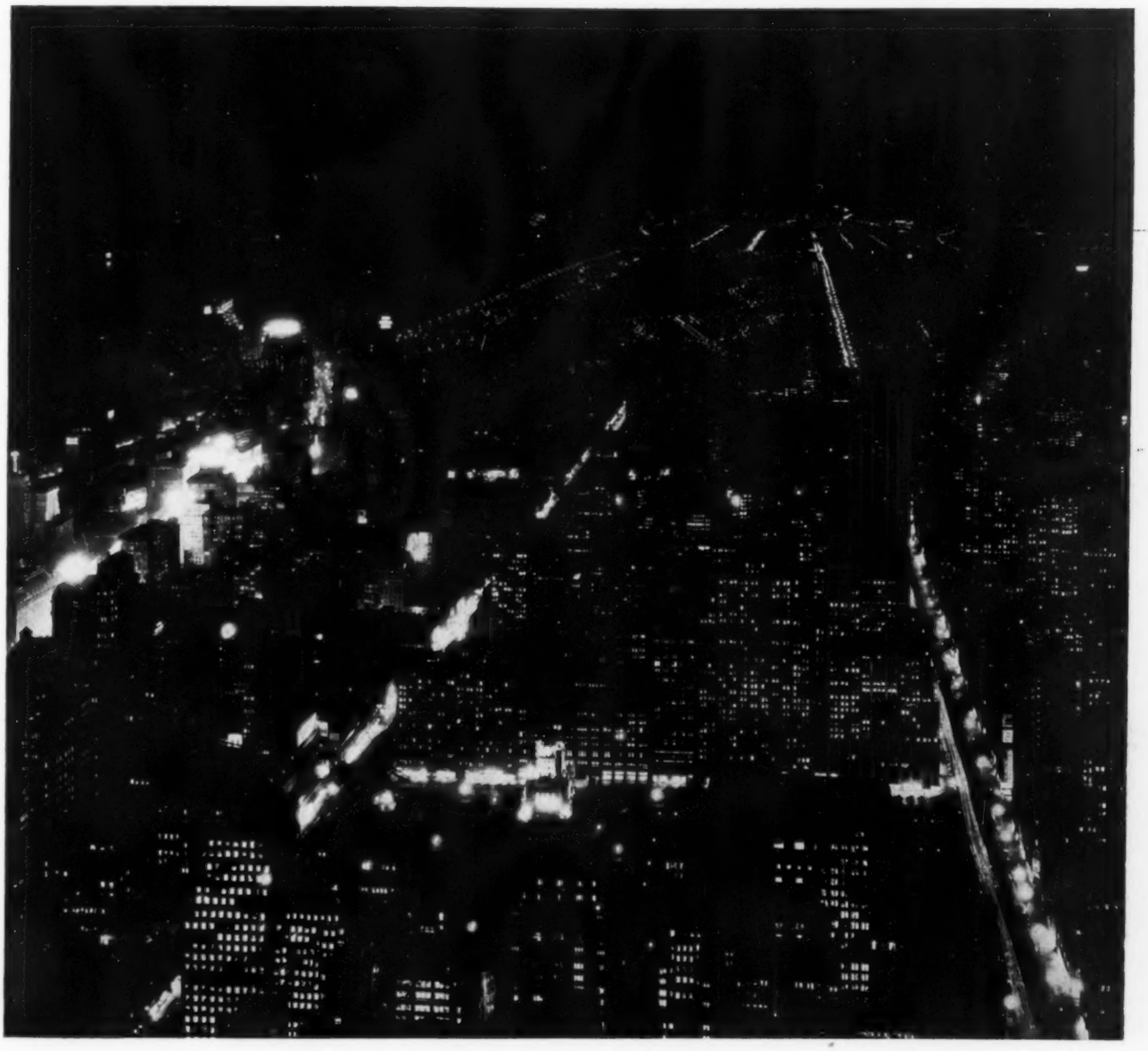
No pre-occupation with practical problems alone, no merely mechanical expression of function, will produce this work of art. It only can be when the practical elements have been fused in the soul of the artist that the work of art—essentially, vitally new—can appear. We speak of the influence of economic forces as if merely to incorporate them were the province of art. So long as the new works remain a product of law, of machinery, of economics, they will never constitute a new art.

The problem of artistic merit is independent of style. We know that it rests more on the personal force and fire of the individual artist, which can transmute and rekindle old elements, just as it can with new elements create something new under the sun. We may agree, for convenience, to distinguish "types" and "styles"—we recognize, for example, striking instances in archaic Greek and Gothic art—but we know that, in art, the superior merit of any given work lies not in its exemplification of such a "type" or such a "style." Its merit lies just in its differences from any prevailing formula, differences which give it a unique character, and make it a creative "expression." Indeed the philosopher Croce has, in our day, insisted with striking emphasis on excluding from the realm of art any work in which generic formulae have not crystallized in individual entity. "In the end, of course," we must agree with Goethe, "it is only through the spirit that technique becomes alive."

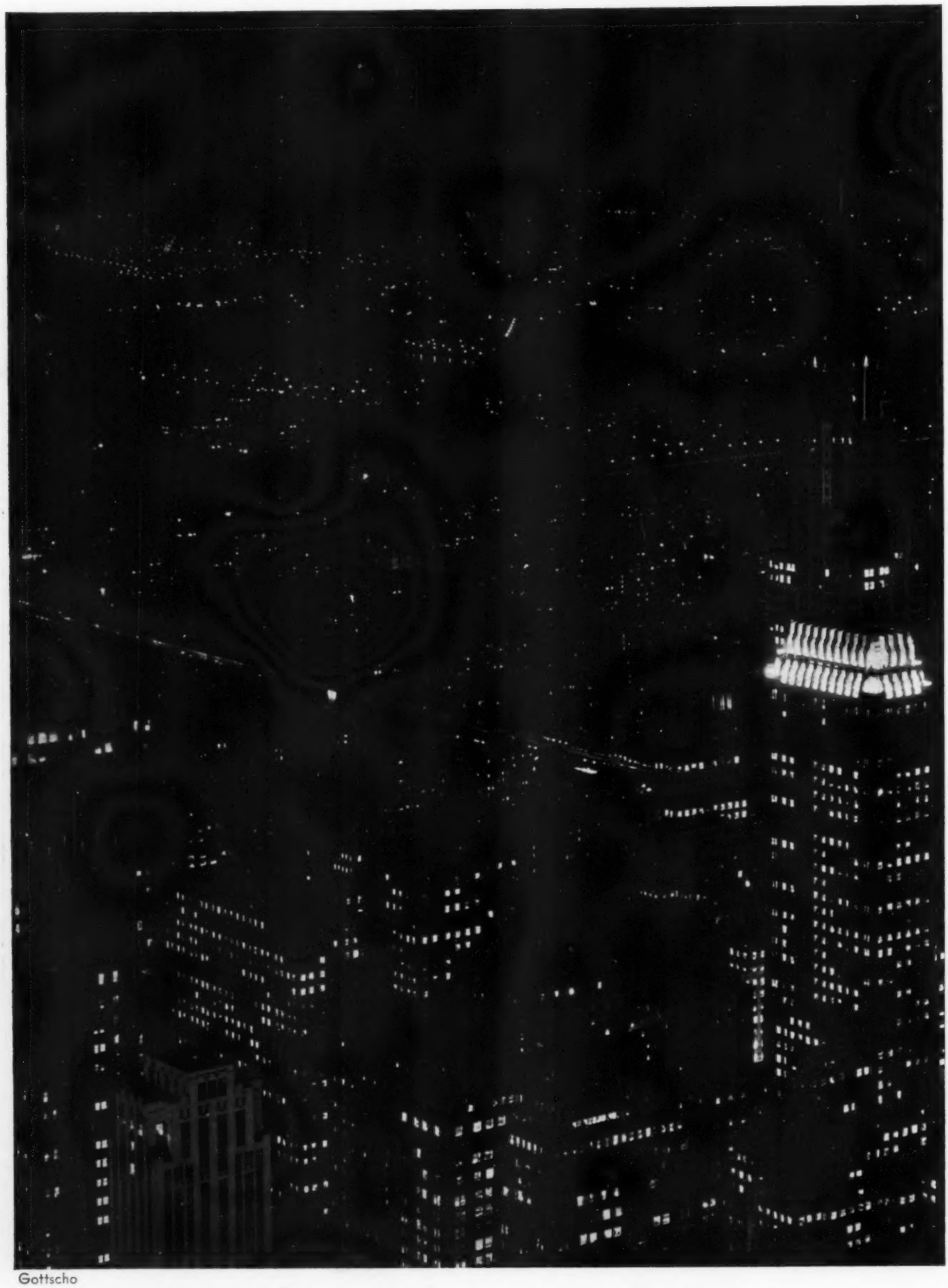
It is one of such creative spirit that America has in Frank Lloyd Wright. From the depths of bitter personal experience Sullivan wrote: "To the master mind . . . imbued with the elemental significance of nature's mood, humbled before the future and the past, art and its outworkings are largely tragic." In Wright too we have a master who has not escaped inherent tragedy, but has enriched us with the only gifts which art can bring, the individual creations of the inspired artist.

NIGHT VIEWS OF NEW YORK CITY

PHOTOGRAPHED BY SAMUEL H. GOTTSCHO

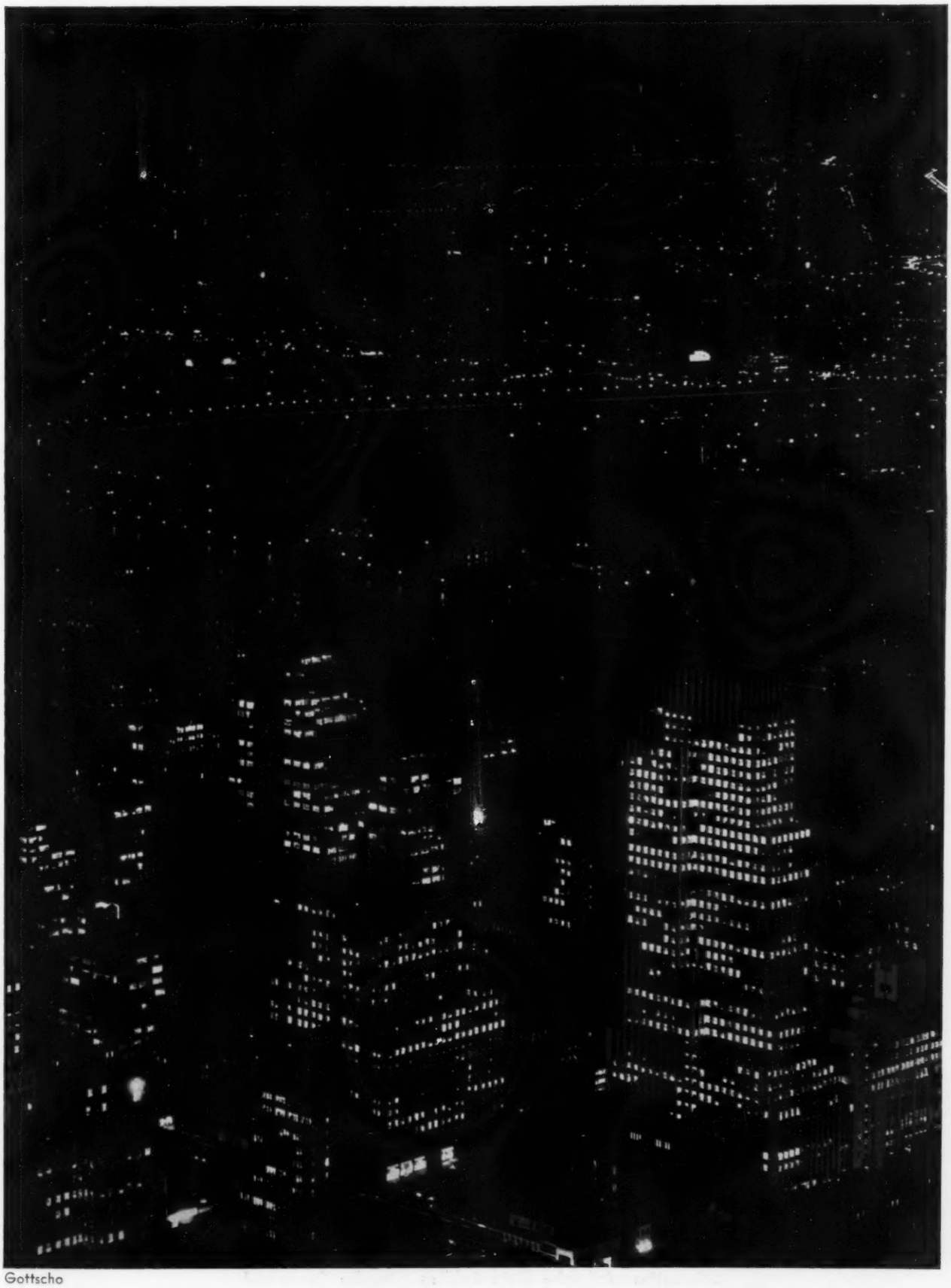


This Portfolio is part of a collection of photographs recently exhibited by Mr. Gottscho at the New York Architectural League. This view of the metropolis shows, at the left, the bright lights of Broadway and Times Square theaters; beyond and near the upper part of the photograph, the Hudson River with the string of small lights outlining the new Washington Bridge; in the upper middle area, Central Park; and at the right, brightly illuminated, Fifth Avenue. The skyscraper seen at the right is 500 Fifth Avenue, designed by Shreve, Lamb and Harmon, architects; it is at Forty-second Street.



Gottscho

The Grand Central zone of Manhattan. At the extreme left, the Lincoln Building; at the right, the Chanin (tower brightly illuminated) and Chrysler Buildings.



Gottscho

The East River and (beyond) Long Island City. In the foreground (right) is the Daily News Building. Crossing Welfare Island is the Queensboro Bridge.

Gottscho

Silhouettes of Empire State Building, Chrysler Tower and other office and loft buildings of Manhattan, seen at dusk.

THE JUILLIARD SCHOOL OF MUSIC

NEW YORK CITY

SHREVE, LAMB AND HARMON ARCHITECTS

The Juilliard Musical Foundation consists of the original Juilliard School of Music and the Institute of Musical Art of the City of New York. The latter is an undergraduate school of about 1,000 members, the former a graduate school of 150 members. At present the Institute occupies the original building designed by Donn Barber, plus an addition on 122nd Street. The graduate school occupies space on floors over and around the auditorium.

General Plan

Two alternatives were possible in developing this project—to erect a monumental building with a compact logical plan in the center of this plot, which measures 200 by 300 feet, or to retain the Institute Building and build around it.

With the old building retained, the school could operate on premises during the building period. Other reasons aside from a saving in final cost made this retention desirable. One hundred feet to north have been left vacant. If the future development of operatic school should require it, this area may be occupied by a much larger hall. Conditions do not warrant sale of property. The school may want it later. At present it cannot build for profit without being subject to taxation.

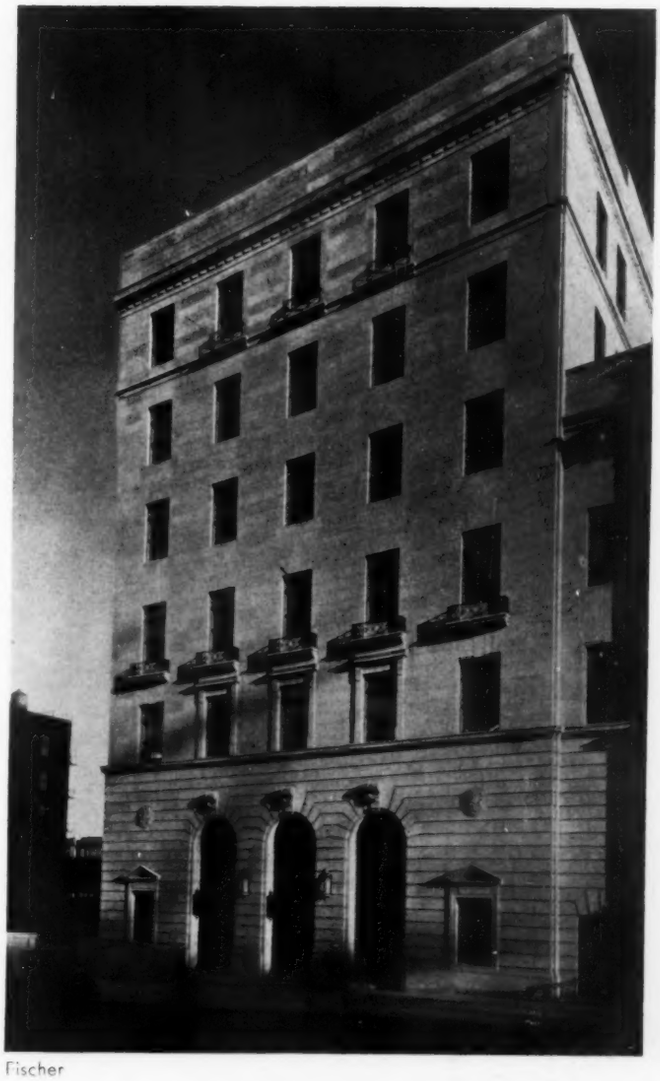
Subway comes to surface on Broadway at 122nd Street, creating a noisy condition. As more than 60 small individual practice rooms were needed, these were placed on the Broadway side and the building is set back from the street. Locker room, store, cafeteria, and other utility rooms take up remainder of Broadway façade so that no studios or classrooms appear there.

Exterior

An attempt was made to keep the new buildings in harmony with Donn Barber's original building as well as in keeping with the present trend and requirements. Carving was almost entirely omitted from new work. The mansard roof was removed from original building.

Interior

New work is modern in character. Decorative treatment of classrooms, studios, corridors and offices was under the direction of Mrs. Elsie Sloan Farley, who also designed the furniture and drapes in the auditorium lounge.



Fischer

The entrance lobby is finished in Formosa Rose, Escallette and Belgian Black marble. Color scheme: grays and rose with black. Deep blue ceiling, 3 tones.

The auditorium is not considered as a theater under the building code for theaters, since seats for performances are not sold. The building, however, does provide ample exits and complete fireproofing.

The color scheme in the auditorium:

Walls—three color spatter, pale peach with lighter tone on flutes.

Ceilings—lighter tones, ornament from light shadows.

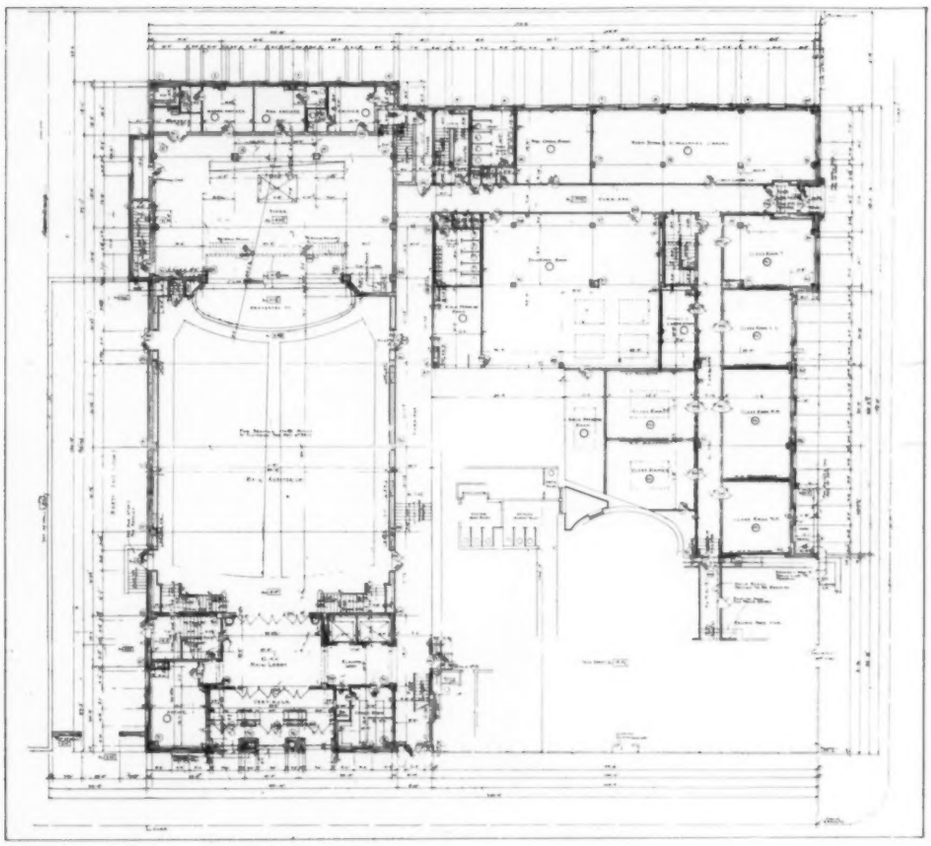
Wainscot—hare wood, silver gray with black and walnut.

Valance and sides of stage opening—silver and black figured.

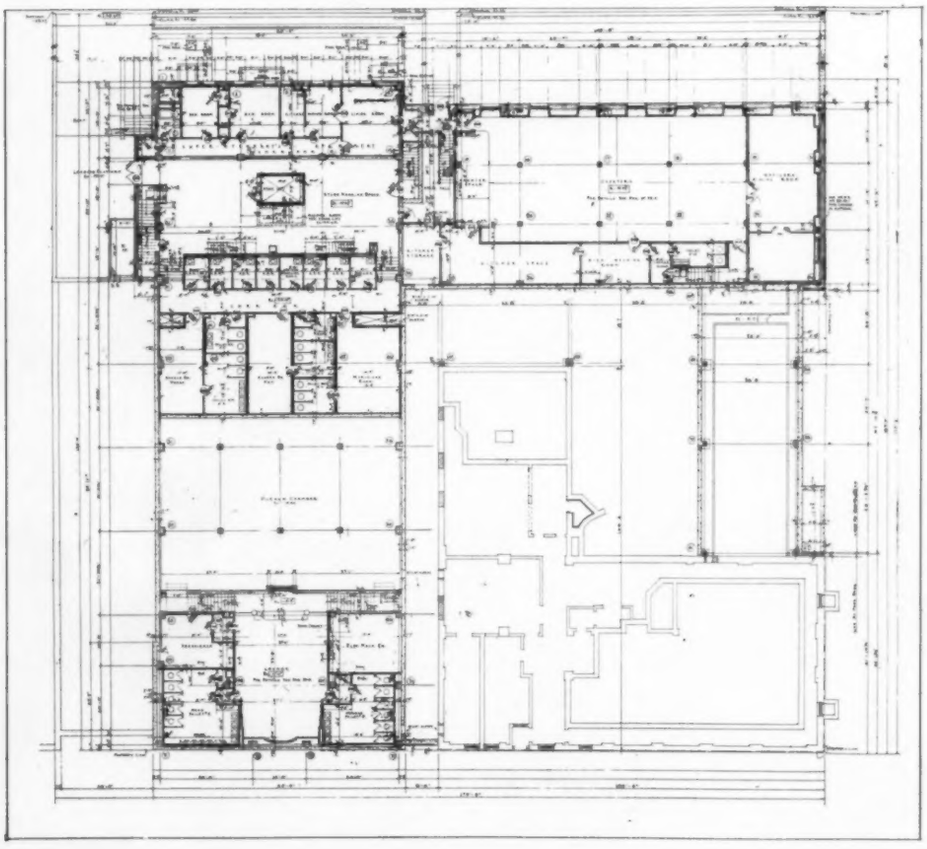
Curtain—coral, plain.

Seats—striped, 3 shades, coral to mahogany.

Carpet—fine pattern, mahogany to black.

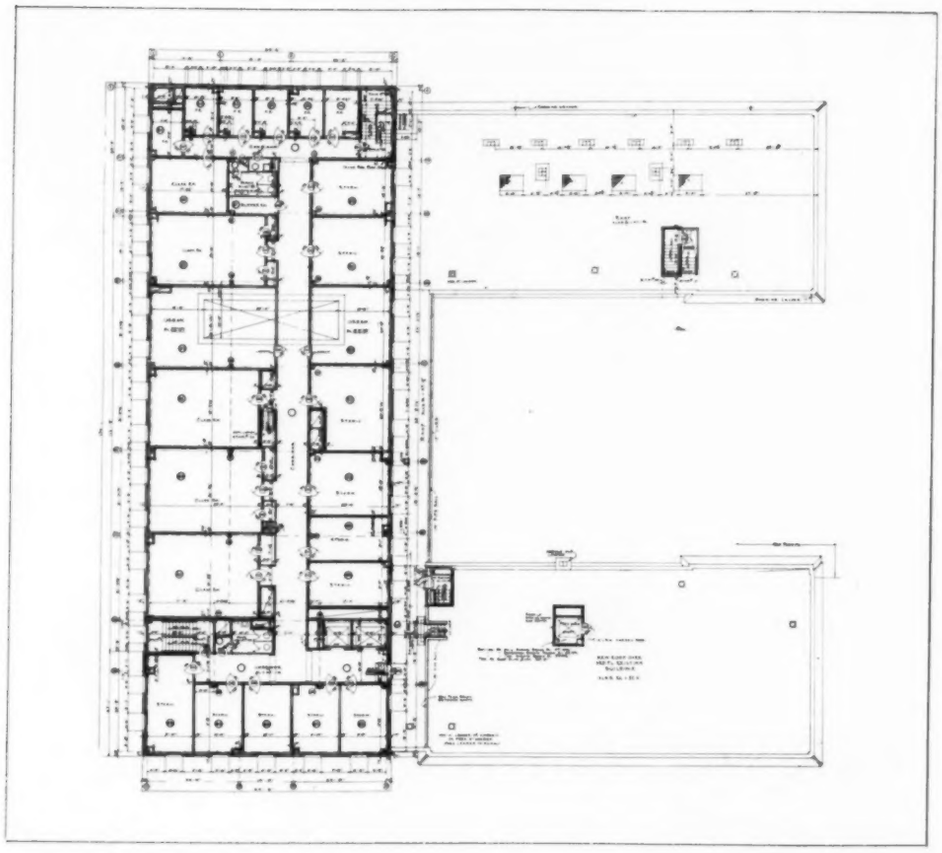


Basement Floor Plan

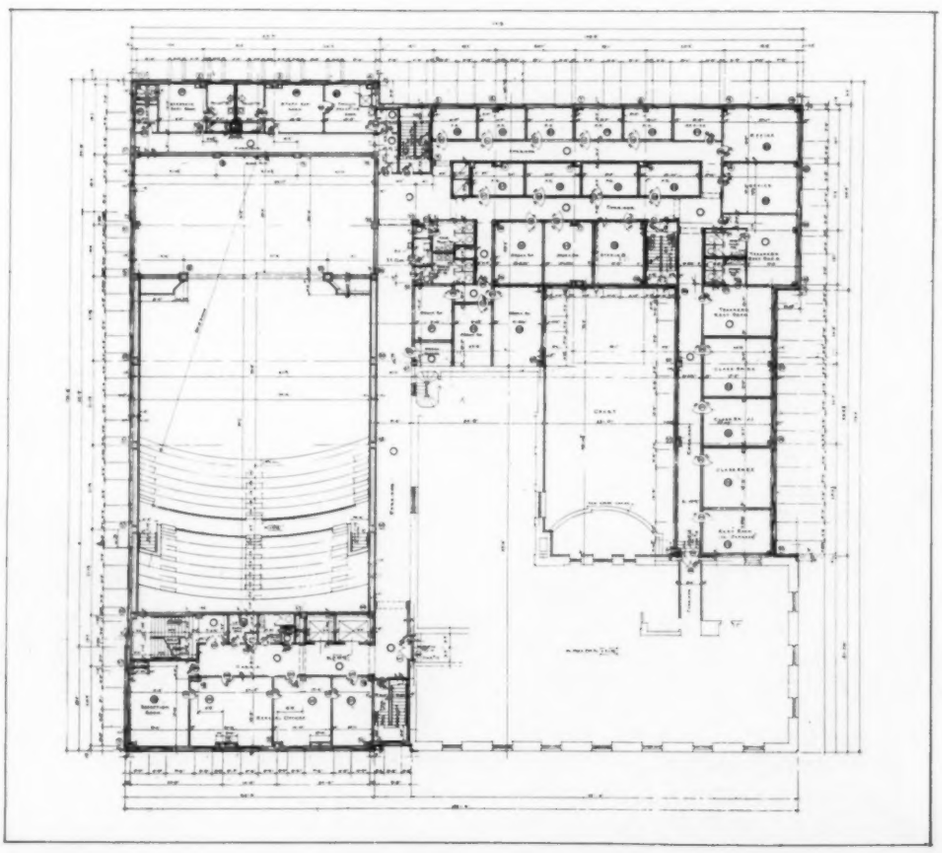


Sub-Basement Floor

SHREVE, LAMB
AND HARMON
ARCHITECTS



Fourth Floor Plan



Second Floor Plan

FIRM SPECIFICATIONS

It is possible today to contract for many fabricated materials for less than their actual material and labor cost. No overhead; profit long since forgotten. This is no help to any one. Instead, it creates a situation full of potential trouble for manufacturer, architect and client and makes it necessary more than ever for the architect to steer a careful course.

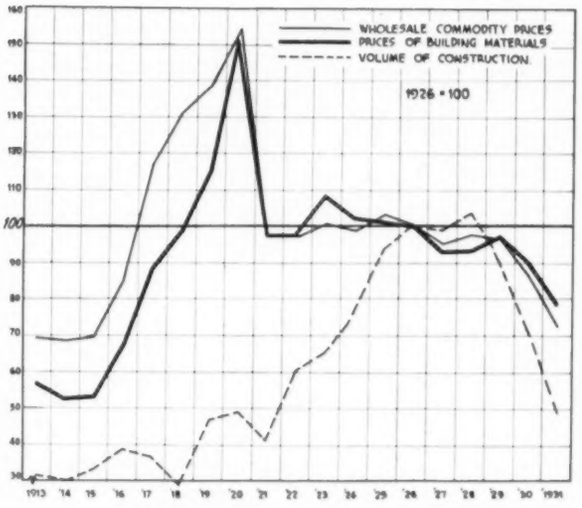
I do not refer to the general decline of material prices as a whole. This has been no more drastic than the general movement of all commodity prices. Moreover, it is a thing admittedly beyond the control of any one group. But when contractors and manufacturers come in with prices approximately one-half the figure quoted by reliable competitors, equally eager for business, then it is time to look out. Unfortunately, too, this condition is especially recurrent among fabricated products where no basic general specifications exist such as govern transactions in cement, structural steel and the like.

Superficially it may seem smart to take advantage of any price that a hitherto responsible manufacturer may offer regardless of what it costs to build his product honestly and well. Actually no series of such transactions can occur without some essential thing coming out of the quality of the thing itself. Materials may be modified in a hundred small ways; standards of workmanship are governed entirely by the general policies of the manufacturer. Moreover, reliable manufacturers, today, are faced with the alternative of closing up, or of cutting costs beyond any reasonable hope of maintaining quality.

These alternatives are equally unfortunate for the client who builds with the expectation of reasonable obsolescence and fair maintenance costs. By the time troubles develop as a result of sharp buying, the apparent economies of the transaction will be forgotten; and the architect may then be called upon to explain things in terms of conditions that no one can recall.

It cannot be argued either, that high prices during the past boom years have enabled manufacturers to build up tremendous reserves, out of which they may be expected to finance losing transactions at this time. Aside from a brief rise due to an actual scarcity of building materials in 1923, prices declined steadily throughout the entire peak of building activity which began in 1921, and began to sag in 1929. F. W. Dodge Corporation shows clearly, in the accompanying curves, what the relationship has been between volume of construction and the prices of building materials as compared to prices of commodities generally.

Granting that a real danger exists to all parties in transactions where some one has got to lose money, what can be done about it? For no one in his senses will deliberately pay high prices unnecessarily in the vague hope of rectifying a bad general situation.



It seems to me, right now, that the architect holds all the cards, and that there is no mystery about what he should do with them. One thing clearly indicated is the need for more careful study than ever before of the basic construction details of fabricated products. There is more time now for manufacturers to explain basic values, and specifications writers have more time to catch up with progress. It is time, moreover, for extreme rigidity of specifications and for sharp restriction of latitude in effecting changes of specifications as drawn. Two more or less distinct schools of thought have grown up among specifications writers: one maintaining that the architect's function nearly approaches that of purchasing agent in finality of choice between competing products; the other leaning towards the theory that specifications should allow a high degree of latitude lest monopolies be created to which their clients would inevitably pay a high toll. Certainly the latter theory is hardly tenable at this time.

Furthermore, our particular policy today is to exercise unusual care in admitting products as "or equal" under the specifications. Where a question arises under a general contract, we regard it as only reasonable for the architect to require submission of the entire file of subcontract prices and, if necessary, consult the bidders and give them a chance to justify their position, either high or low. Where equipment contracts are placed direct by the architect, we have of course an especial opportunity of standing between our clients and the clamor for business at almost any price.

In the final analysis, it is pretty well up to the architect, whether or not there is to be any continued stability in the building business. There is no similar independent professional group controlling any comparable share of American business as a whole. It is a marvelous time for professional control of a business to justify itself.

DANIEL HIGGINS, Architect,
Office of John Russell Pope.

Fischer

JUILLIARD SCHOOL OF MUSIC, NEW YORK CITY
SHREVE, LAMB AND HARMON, ARCHITECTS

OTHER BUILDINGS ILLUSTRATED IN THIS PORTFOLIO:

MIDLAND COUNTRY CLUB AT MIDLAND, MICHIGAN — Frantz and Spence, Architects; Alden B. Dow, Associate Designer.

HOUSE OF H. D. HYNDS, AT SCARSDALE, NEW YORK — Dwight James Baum, Architect.

SCULPTURE IN FOYER, CINEMA ART THEATER, CHICAGO — Armstrong, Furst and Tilton, Architects.

DELAWARE COUNTY COURT HOUSE AT MEDIA, PENNSYLVANIA — Clarence W. Brazer, Architect.

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NEW YORK CITY
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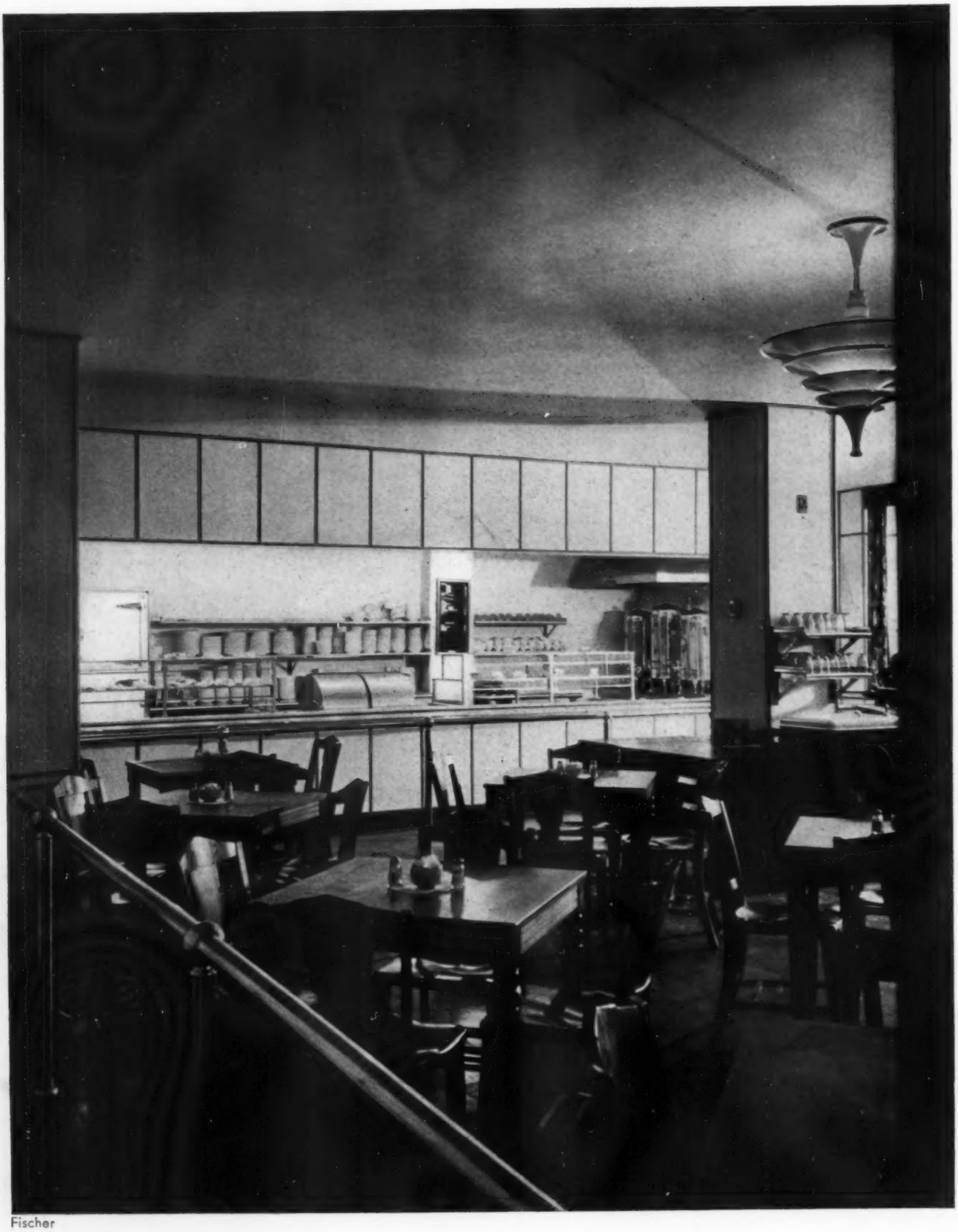

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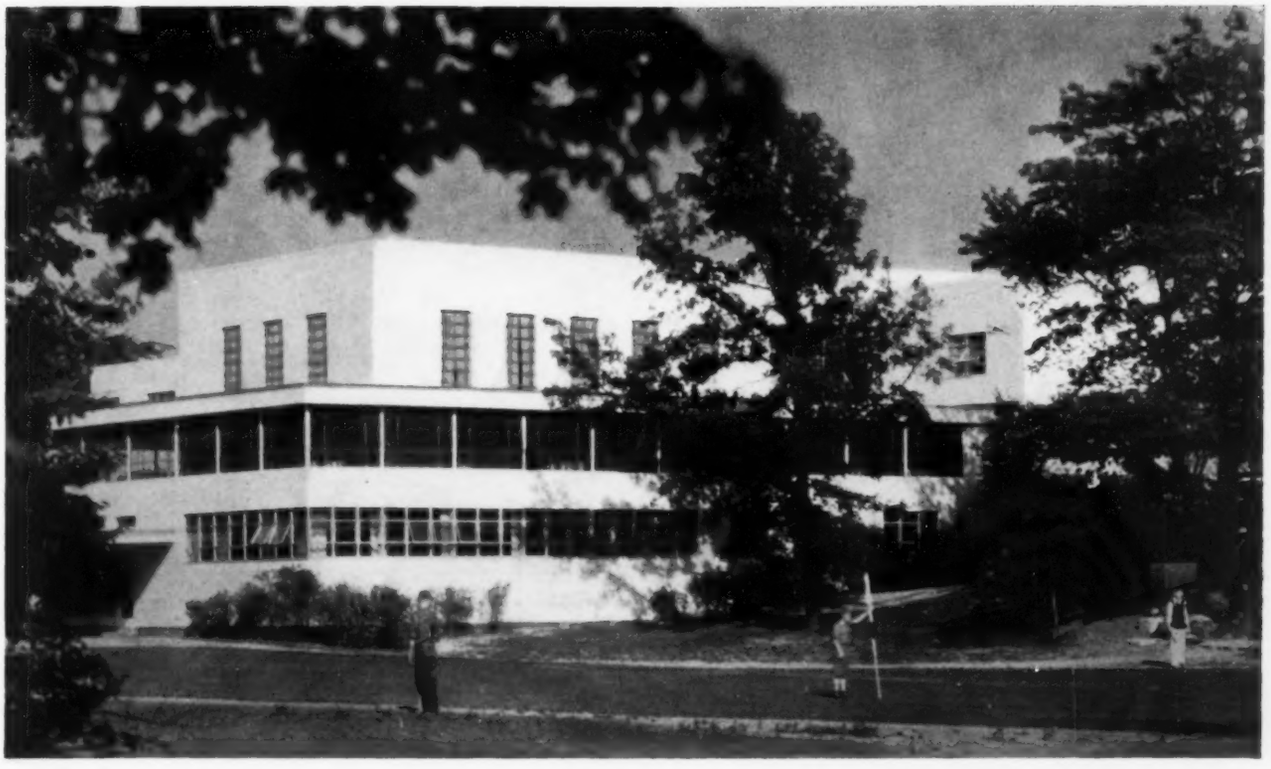
JUILLIARD SCHOOL OF MUSIC
NEW YORK CITY
SHREVE, LAMB AND HARMON, ARCHITECTS



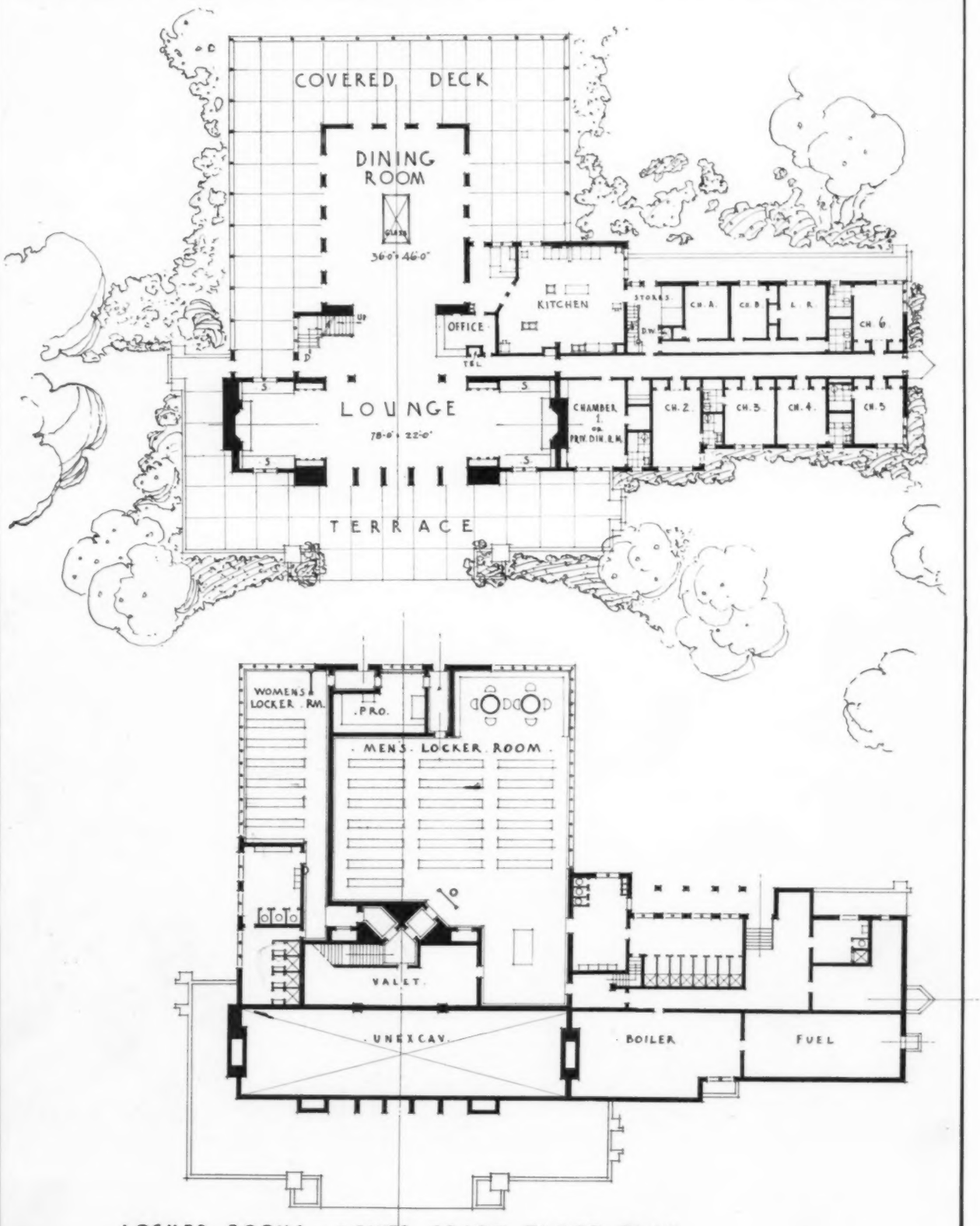
Wright's Studio

West Elevation. Location of building on sloping ground made possible the use of two levels for ground floor.

MIDLAND COUNTRY CLUB, MIDLAND, MICH.
FRANTZ AND SPENCE, ARCHITECTS
ALDEN B. DOW, ASSOCIATE DESIGNER

A CLUBHOUSE FOR THE MIDLAND COUNTRY CLUB MIDLAND MICHIGAN

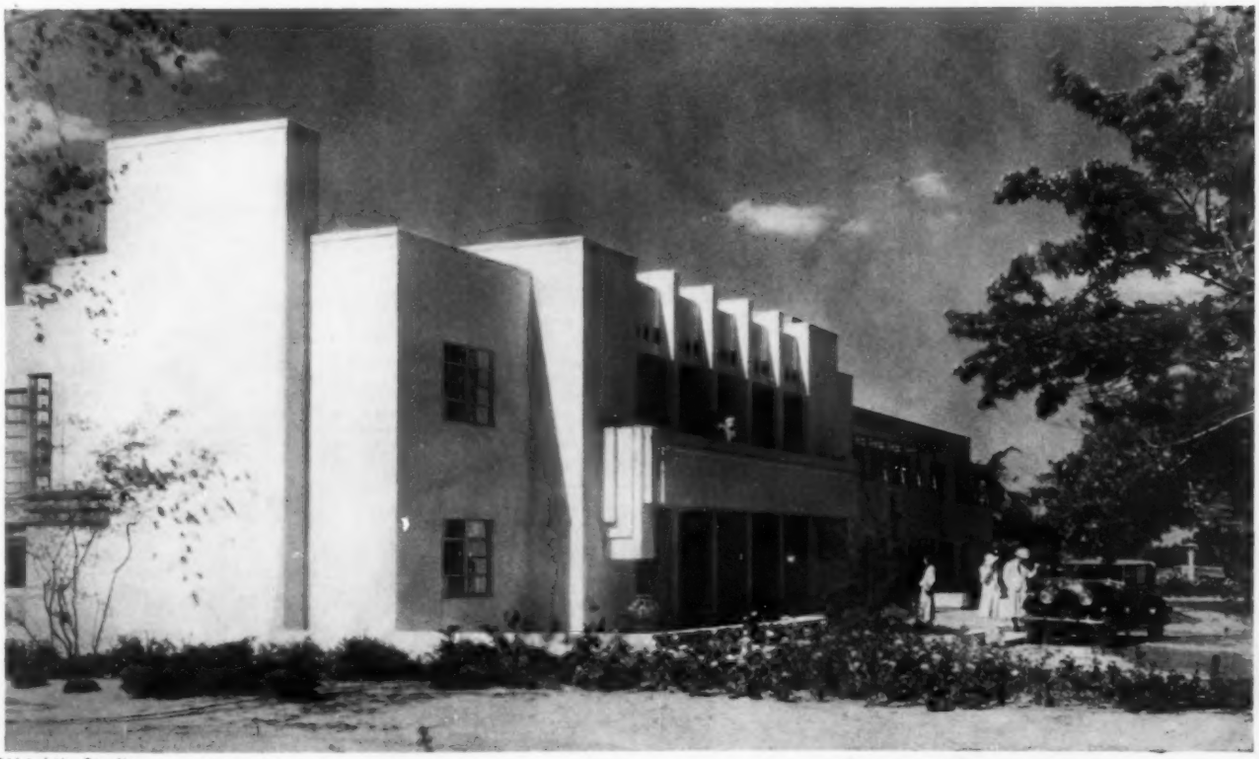
ROBERT B FRANTZ AND JAMES A SPENCE ARCHITECTS SAGINAW • ALDEN B DOW ASSOCIATE DESIGNER



LOCKER ROOMS - LOWER GRADE FLOOR PLAN

SCALE — 10

East Elevation.



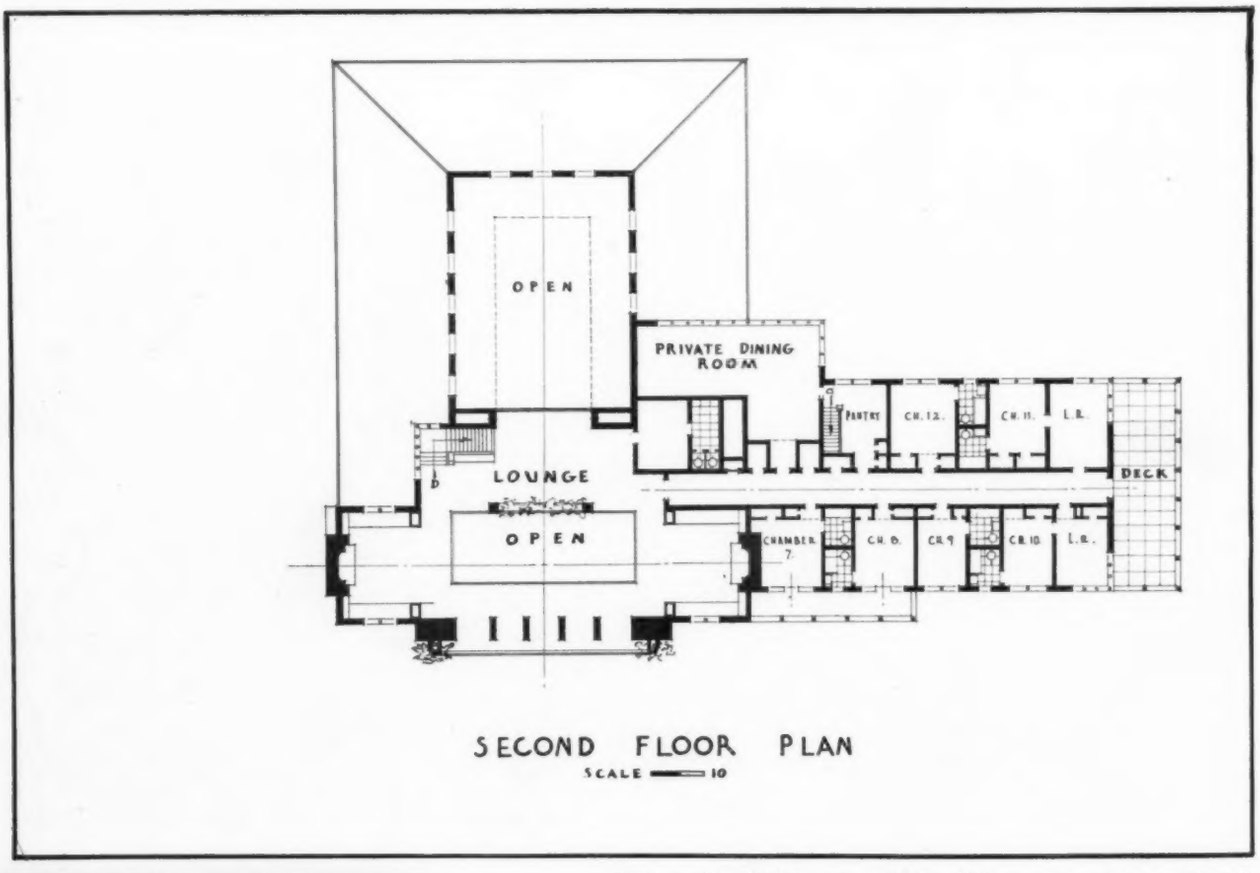
Wright's Studio

Main Entrance. Locker rooms occupy lower terrace level with direct access to both main lobby and golf course.

MIDLAND COUNTRY CLUB, MIDLAND, MICH.
FRANTZ AND SPENCE, ARCHITECTS
ALDEN B. DOW, ASSOCIATE DESIGNER

Wright's Studio

Lounge from Second Floor



SECOND FLOOR PLAN

SCALE — 10

MIDLAND COUNTRY CLUB, MIDLAND, MICH.
FRANTZ AND SPENCE, ARCHITECTS
ALDEN B. DOW, ASSOCIATE DESIGNER

Flush ceiling lights are used in dining room. Cost of building was $95,000 or 24¢ a cubic foot.

Balcony overlooking Dining Room.

Wright's Studio

Dining Room from Lobby Desk.

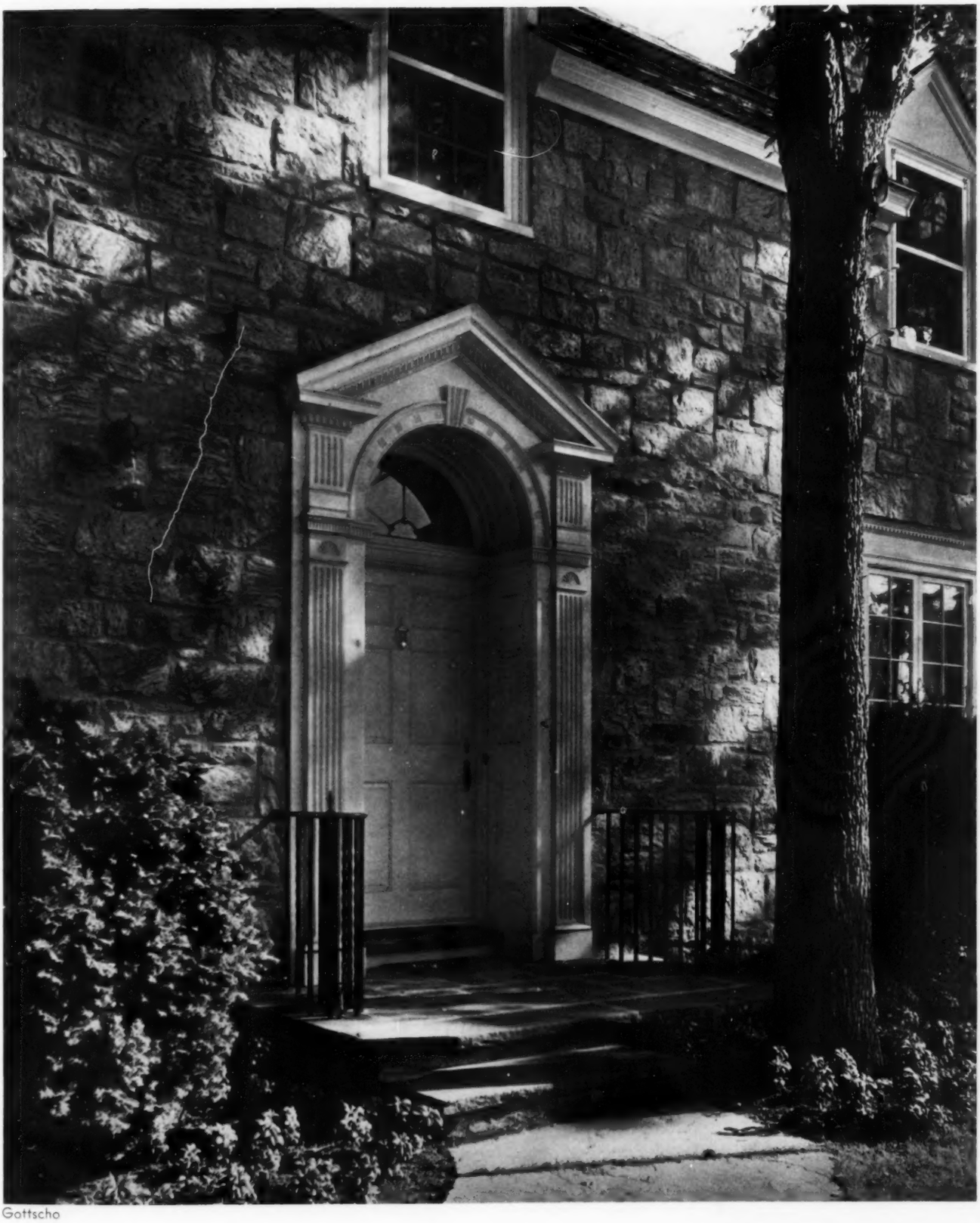
MIDLAND COUNTRY CLUB, MIDLAND, MICH.
FRANTZ AND SPENCE, ARCHITECTS
ALDEN B. DOW, ASSOCIATE DESIGNER

Screened Terrace on Three Sides of Dining Room.

Wright's Studio

Private Dining Room on Second Floor.

MIDLAND COUNTRY CLUB, MIDLAND, MICH.
FRANTZ AND SPENCE, ARCHITECTS
ALDEN B. DOW, ASSOCIATE DESIGNER

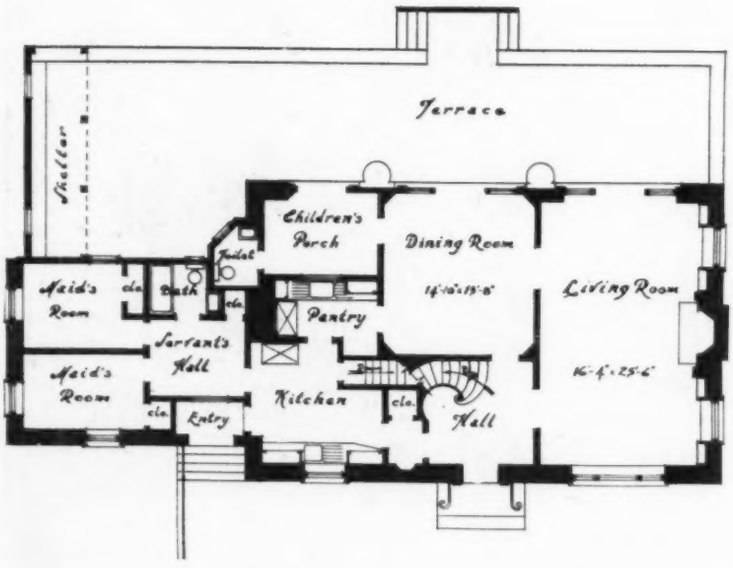


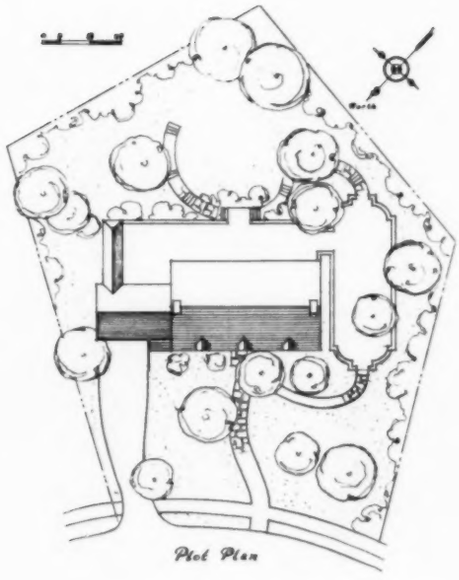
Gottscho

Entrance Detail.

HOUSE OF H. D. HYNDS
SCARSDALE, NEW YORK
DWIGHT JAMES BAUM, ARCHITECT

Gottscho





HOUSE OF H. D. HYNDS
SCARSDALE, NEW YORK
DWIGHT JAMES BAUM, ARCHITECT

Gottscho

HOUSE OF H. D. HYNDS
SCARSDALE, NEW YORK
DWIGHT JAMES BAUM, ARCHITECT

Gottscho

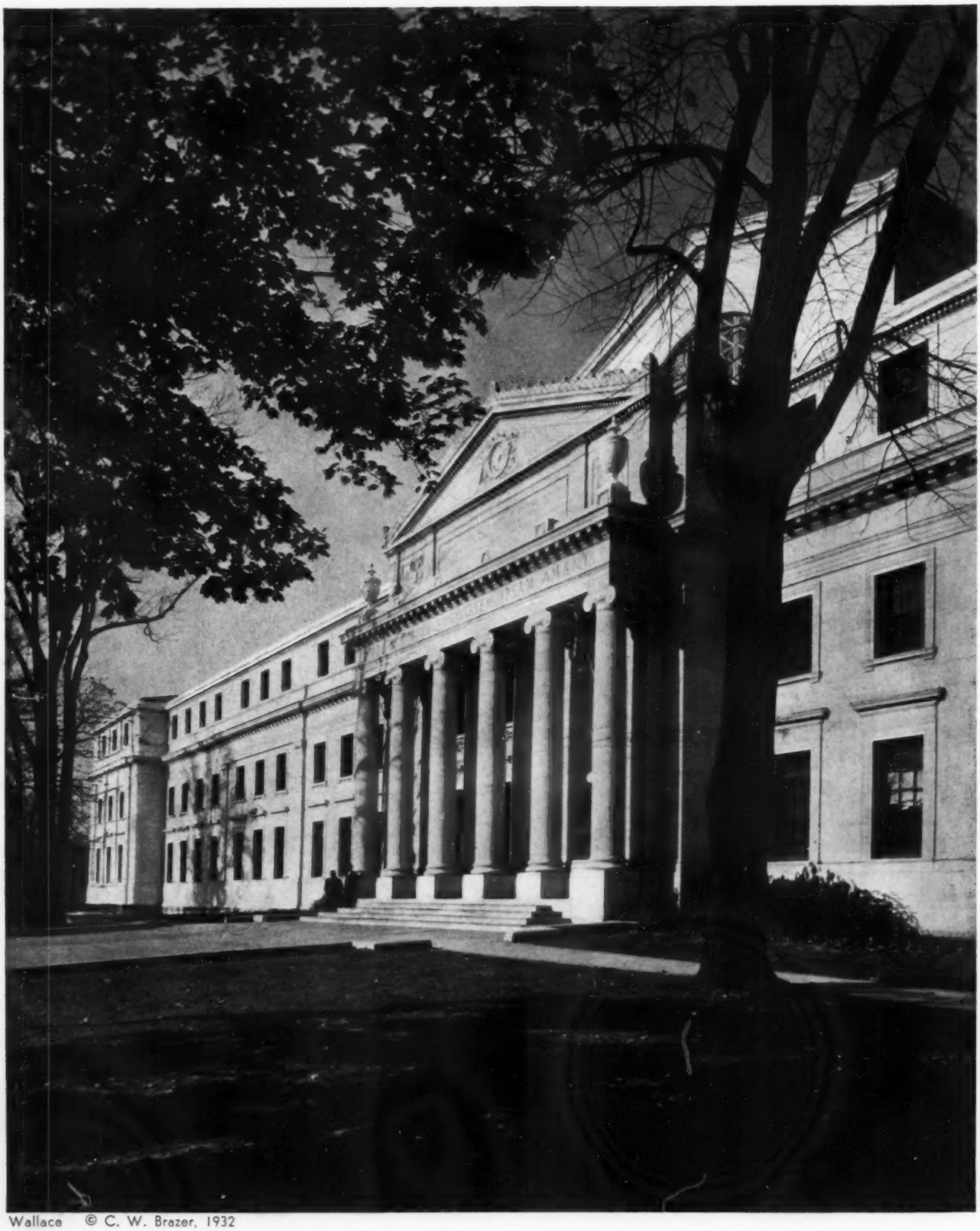
Detail of Entrance Hall.

HOUSE OF H. D. HYNDS
SCARSDALE, NEW YORK
DWIGHT JAMES BAUM, ARCHITECT

Trowbridge

Sculptured Figure in Foyer.

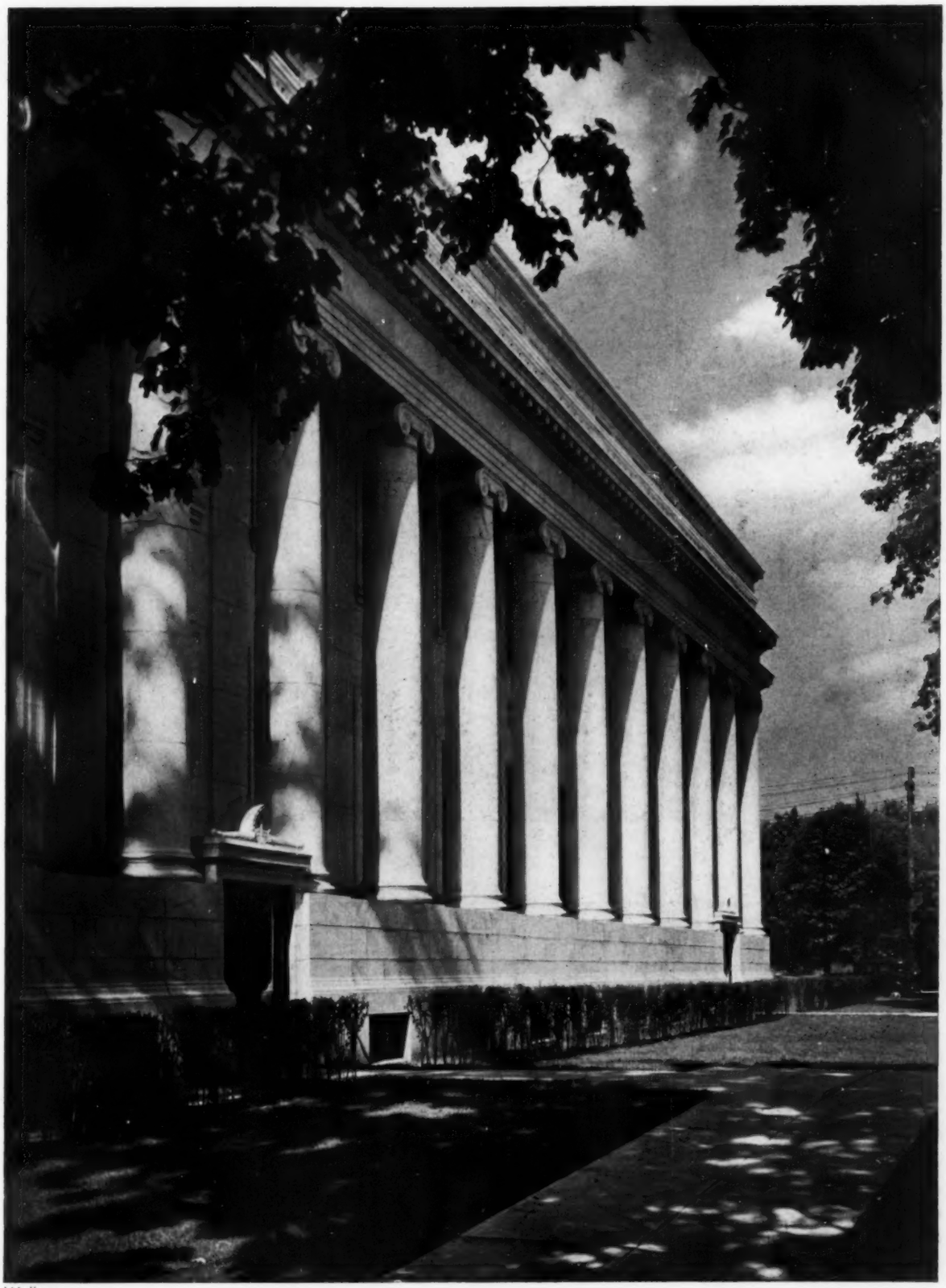
CINEMA ART THEATER, CHICAGO
ARMSTRONG, FURST AND TILTON
ARCHITECTS



Wallace © C. W. Brazer, 1932

DELAWARE COUNTY COURT HOUSE
MEDIA, PENNSYLVANIA
CLARENCE W. BRAZER, ARCHITECT

South Front. Original central portion of this building was erected in 1857. Other additions were made subsequently.



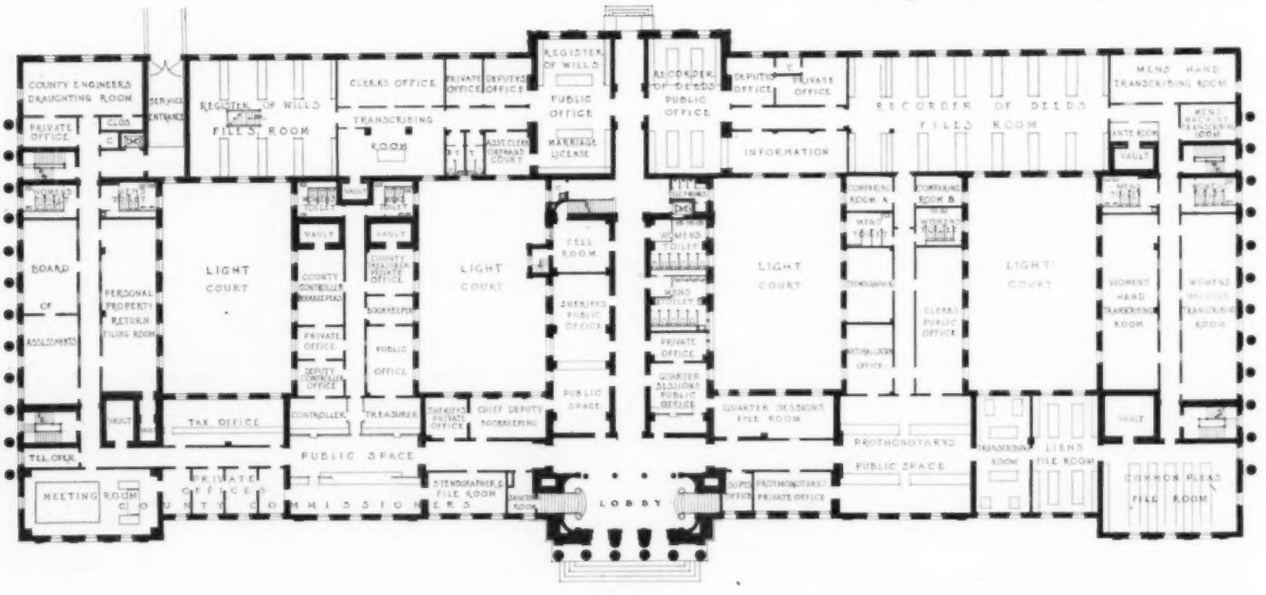
Wallace

East Façade. Recent alterations comprise 3-story-and-basement wings, a new basement under entire building, and a law library on fourth floor.

DELAWARE COUNTY COURT HOUSE
MEDIA, PENNSYLVANIA
CLARENCE W. BRAZER, ARCHITECT

Wallace

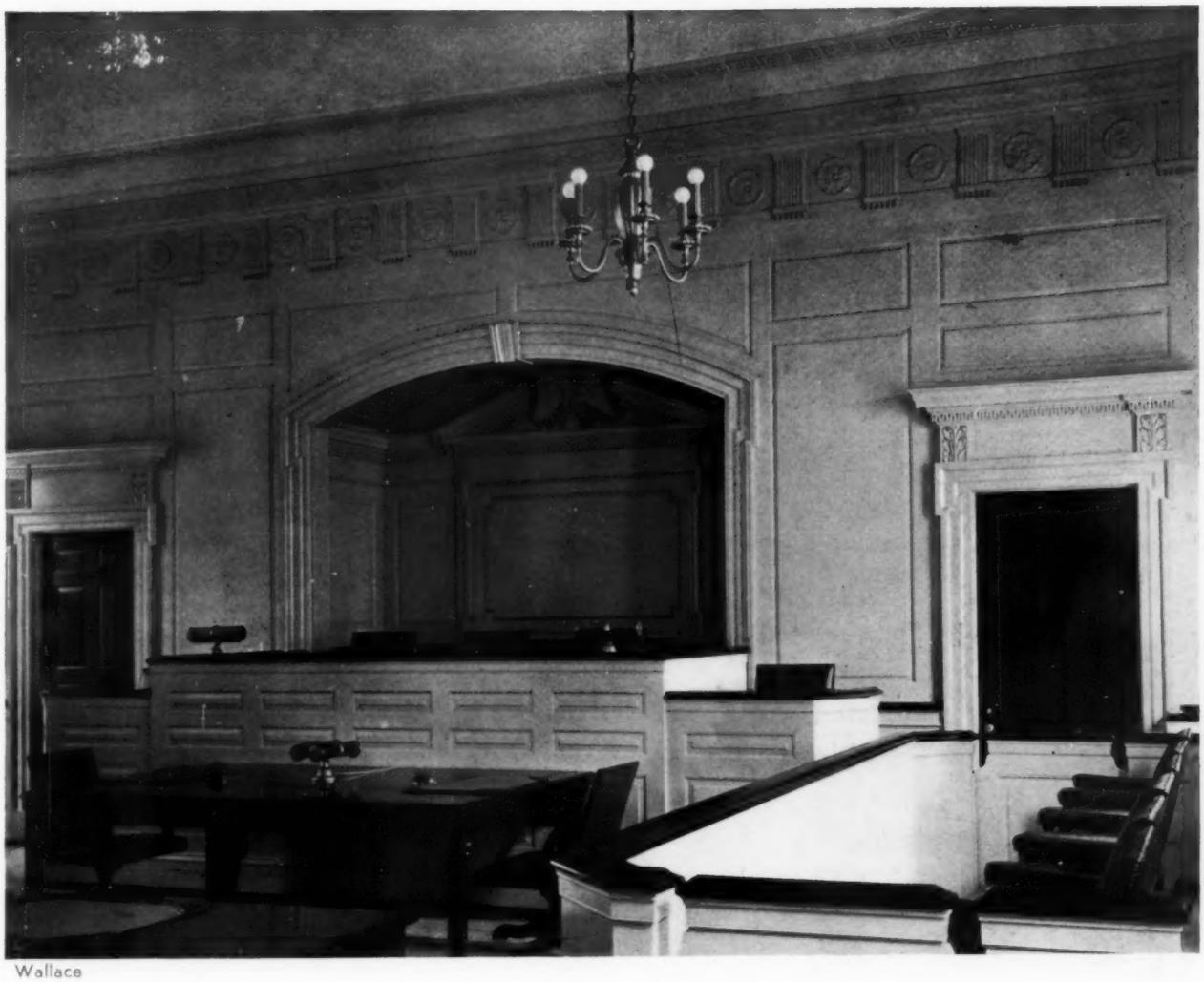
Judges' Bench in Court Room No. 2



FIRST FLOOR PLAN

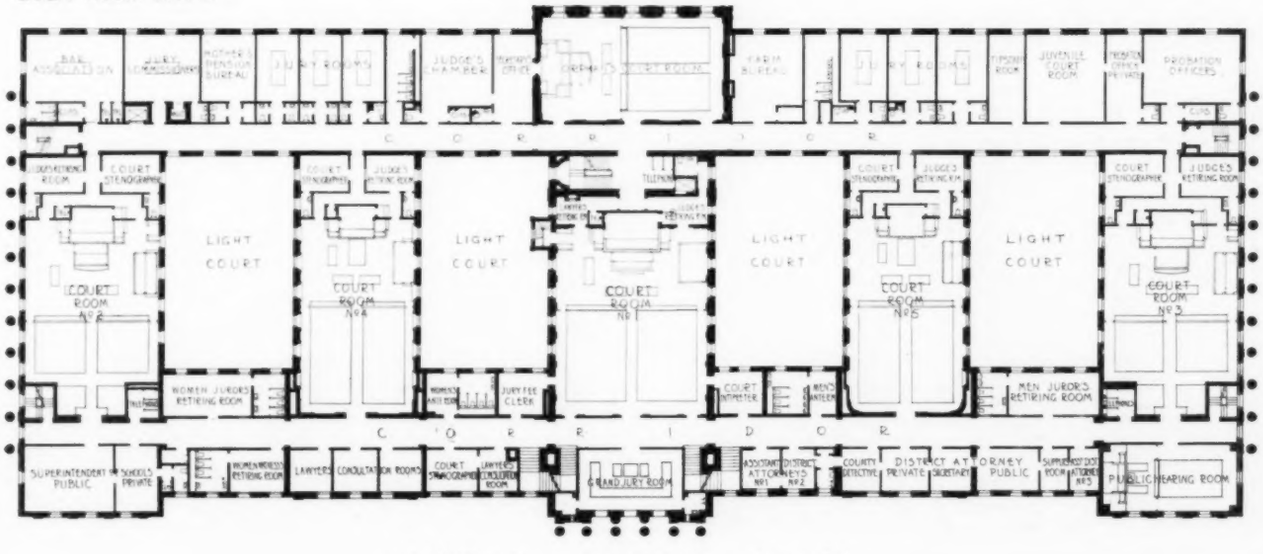
DELAWARE COUNTY COURT HOUSE
MEDIA, PENNSYLVANIA
CLARENCE W. BRAZER, ARCHITECT

Five new court rooms, the commissioners' meeting room, public hearing room and the law library are the main features of the building.



Wallace

Court Room No. 5



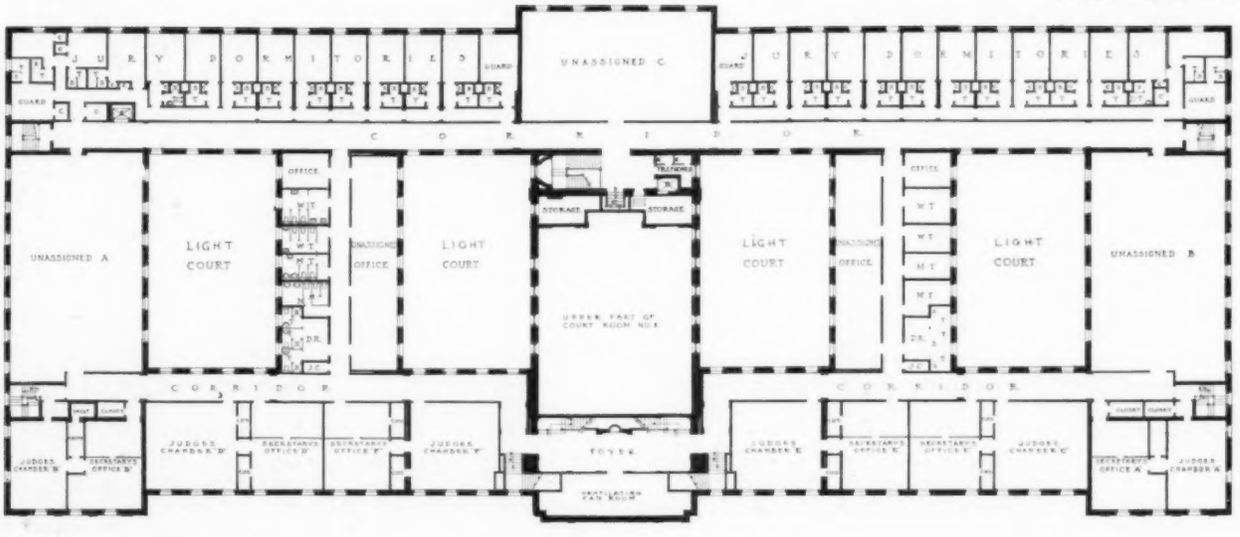
SECOND FLOOR PLAN

Each of the court rooms is designed in a period of early American architecture of approximately 1720, 1740, 1760, 1780 and 1800. The law library is in the Pompeian style.

DELAWARE COUNTY COURT HOUSE
MEDIA, PENNSYLVANIA
CLARENCE W. BRAZER, ARCHITECT

Wallace

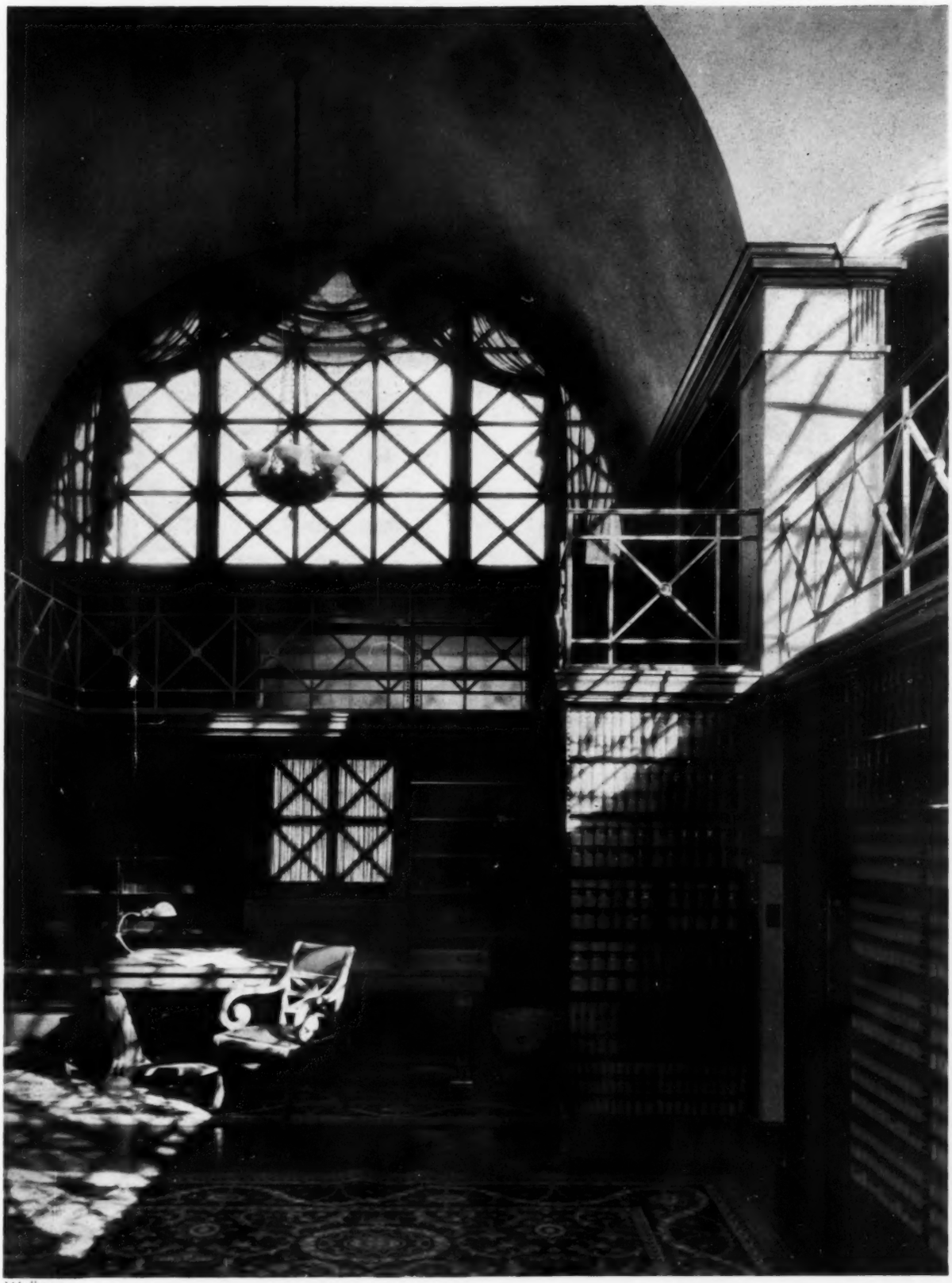
Court Room No. 5



THIRD FLOOR PLAN

DELAWARE COUNTY COURT HOUSE
MEDIA, PENNSYLVANIA
CLARENCE W. BRAZER, ARCHITECT

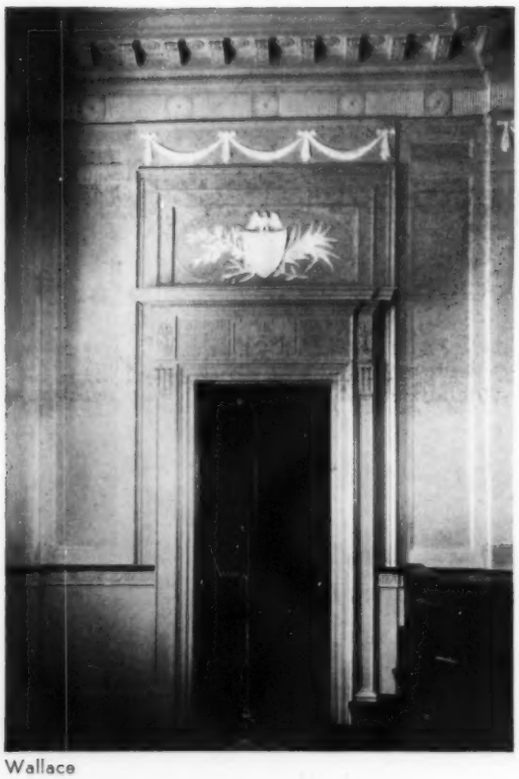
The furniture, fixtures and decorations were designed and detailed in the same periods with the assistance of Esther Stevens Fraser, decorator.



Wallace

Alcove of Law Library.

DELAWARE COUNTY COURT HOUSE
MEDIA, PENNSYLVANIA
CLARENCE W. BRAZER, ARCHITECT



Wallace

DELAWARE COUNTY COURT HOUSE
MEDIA, PENNSYLVANIA
CLARENCE W. BRAZER, ARCHITECT

Details of doors in court rooms showing treatment in various architectural period styles.

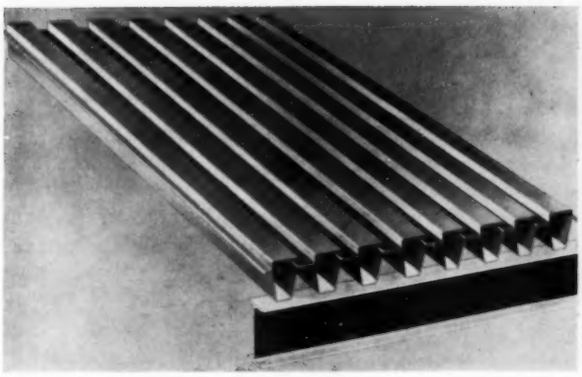


Fig. 1—K-type steel floor slab.

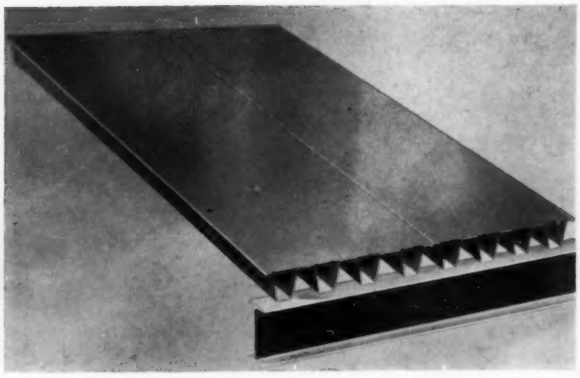


Fig. 2—FK-type steel floor slab.

This keystone steel-slab unit develops maximum efficiency in carrying loads. Units are factory-fabricated, 24 inches wide, and up to 12 feet 5 inches in length.

AN INNOVATION IN STEEL FLOORING

By J. H. YOUNG

The steel flooring described in this article is the result of a comprehensive investigation to achieve a new floor construction which is light in weight, easy to assemble and efficient in carrying loads. The experimental work has been conducted at the Mellon Institute of Industrial Research in Pittsburgh by Dr. Young, Senior Fellow on a series of Multiple Fellowships sustained by H. H. Robertson Company, Pittsburgh. The product is now on the market.

Floors have gradually evolved from the earthen floor of the primitive savage, through stone and wood, natural and readily available materials, to concrete-tile and steel, or combinations thereof. Until the advent of steel-structured buildings in the early eighties, the chief concern in the production of floors was that they should be sufficiently strong and abrasion-resistant to survive the service conditions involved.

As American commercial life changed, however, rapid expansion became necessary. The demand for large areas of business space in certain localities became great; and it was necessary to expand vertically instead of horizontally. With this vertical expansion came the ever-increasing use of steel, which finally made possible the modern skyscraper. This relatively new form of building has necessitated drastic changes in accepted methods of construction and makes it imperative that the weight of materials entering into such structures be decreased without impairing their strength. Economies of construction are also much to be desired; and more and more scientific research is being applied to make them possible.

Since the floor space in tall buildings represents a very large portion of the dead weight, it seems logical to attempt alterations in this unit. Such alterations have been made in the past mainly by the employment of combinations of inherently bulky materials. More recently, however, certain elementary types of steel floors have proved the intrinsic worth of steel as a flooring material in displacing the more cumbersome and expensive masonry types of floors. The savings in erection time and dead load made possible by such floors have created great interest in the building trades.

It has been with these facts in mind that research and development at Mellon Institute have led to further improvements in steel for flooring and have culminated in the successful production of the new type of steel floor described in this article.

Features of the New Flooring

This research-made steel floor is a factory fabricated unit 24 inches wide and up to 12 feet 5 inches in length at present. Longer spans will be manufactured within 4 months. The unit is built by preforming two steel sheets and subsequently welding them together in the plane above the neutral axis. A cross-section taken across the width of the completed unit shows four keystone-shaped cells all connected together near the neutral axis. This keystone steel-slab-unit (shown in Figs. 1 and 2) in its final form is flat and as readily handled as heavy planking. The design is such as to develop maximum efficiency of the metal from the load-carrying standpoint.

The physical properties listed in Table A are interesting in that they may assume either large or small values dependent upon the gauges of sheet metal used in fabrication. The high strength factors combined with the relatively low weight per square foot as indicated in the table suggest

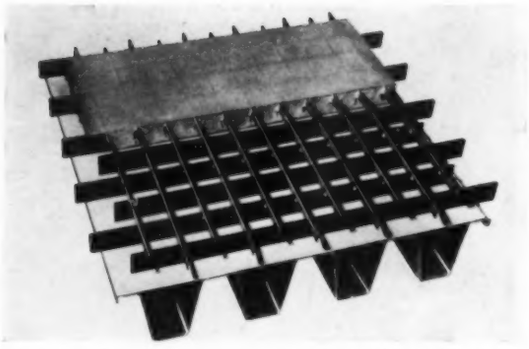


Fig. 3—Steel flooring unit on which has been placed steel grid with concrete fill to make a strong bridge floor.

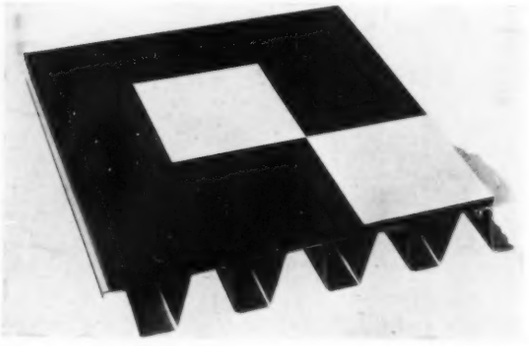


Fig. 4—Mastic tile floor finish applied over steel flooring.

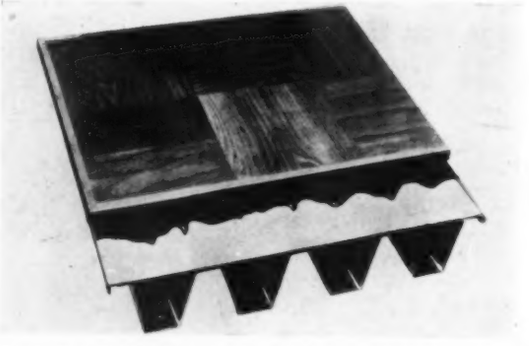


Fig. 5—Cellized wood finish applied to steel flooring.

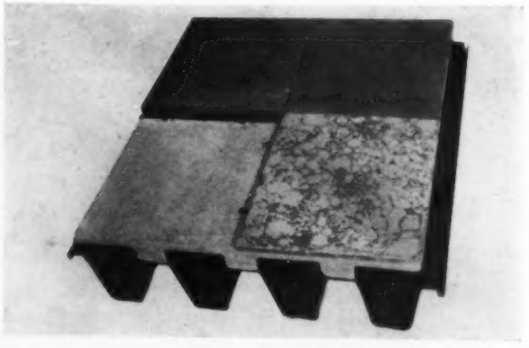


Fig. 6—Terrazzo-type floor finishes applied to steel flooring.

that savings in building construction may be effected because of the decreased load-carrying requirements for floor slabs columns and foundations. The extra strength of the units make possible their use for bridge floors (see Fig. 3).

Besides being incombustible and fire-safe this floor slab is exceptionally adaptable to various types of floor finishes. Concrete fill is applied directly to the surface of the floor. Ceilings can be suspended from the underside of the flooring; likewise, steam or water pipes. Plumbing, wiring and various other services are easily installed (and later serviced) in this cellular type of flooring (see Figs. 3 to 10).

Owing to the fact that the units are put in place by welding, construction noise is minimized.

The four keystone-shaped ducts composing each unit are spaced at 6-inch intervals and communicate directly, when in place, with the corresponding ducts of the adjacent section of floor slab. This arrangement enables the utilization of the floor, not only as a load-carrying member, but also as a multiple floor-duct system for handling all types of electrical lines.

Flexibility Offered for Wiring

As an accommodation for an under-floor duct system, this floor slab permits great flexibility in the electrical wiring of a building. It is not difficult to realize how important such flexibility will be to the individual or corporation investing in a building. Modern office buildings, as well as hospitals, professional buildings and buildings for manufacturing, should be equipped with some means whereby electrical outlets can be easily obtainable. Upon erection, the contractor places wiring and outlets wherever deemed necessary in the building. Present floor-duct systems have been developed to take care of the future electrical needs of the tenant, but do so only to a limited extent.

As an example of the electrical changes necessary to satisfy both new and old tenants of an office building, the following details can be cited. The shifting of furniture on occupation of a suite by a new tenant usually requires electrical service in new locations: the positions of telephones must be changed; buzzer service must be provided in new locations; new light outlets are likely to be necessary as well as power outlets for business machinery, such as comptometers, accounting machines and printing equipment. Outlets must be available for equipment used by physicians, dentists, barbers and beauty parlors; and in apartment houses for electrical heating.

If an office building, particularly, is not provided with adequate means of effecting changes such as the above, with ease and without exposed wires, the building soon has a multiplicity of conductors which show themselves beneath the carpets and around baseboards and molding. Such a

condition permanently detracts from the appearance of the building and the value of its rentable space, thereby causing premature obsolescence. The new steel floor, composed of parallel cells with a 6-inch spacing, enables the formation of continuous ducts and the location of electrical outlets within a radius of 3 inches from the exact location required, instead of a radius of 2 or 3 feet, as is possible with present electrical floor-duct systems, thus precluding the likelihood of electrical obsolescence.

Savings in Costs

Present floor-duct systems have been developed to take care of the future electrical needs of multiple-storied buildings. This method of power distribution has in itself an original material cost and in addition necessitates a 3- to 6-inch fill over the unfinished floor to bring the finished floor flush with the duct outlets. Elimination of the ducts alone means a saving of approximately fifty cents to a dollar per square foot, based on the total floor area of the building, while the saving in other materials and labor is considerable. Additional savings in the total erection time of the buildings are made, owing to the fact that it is possible for the electrical as well as other trades to begin work immediately after the floor is in place. Thus, though the new steel floor serves two functions, it answers the requirements of each more efficiently at approximately one-half of the cost of the two combined.

At present there are five methods of electrical distribution through the keystone cells, from which the architect can select the system best suited to the particular building he designs (see Figs. 11 to 15).

Interesting also is the fact that these floor slabs permit the carrying of other types of service as well as electricity. The recent development of flexible copper tubing that can be drawn through the keystone cells in a manner similar to that used for the wiring systems, makes it possible to supply more efficiently hot and cold water, air, steam, gas, and other services to tenants.

This floor is an engineering factory-fabricated member of a building that is not subject to variations resulting from production in place by indifferent labor under varying weather conditions. Only one kind of material for floors must be assembled on the job, prior to incorporation into the working floor structure; and as the floor material can be placed in its final position immediately upon arrival at the building site, a saving in storage space is effected. These are among the features that make this new flooring of interest to the architect, engineer and contractor.

Installation

Installation of the keystone floor is immediately attractive from the standpoints of ease and speed.

Fig. 7—Concrete fill applied directly to steel flooring.

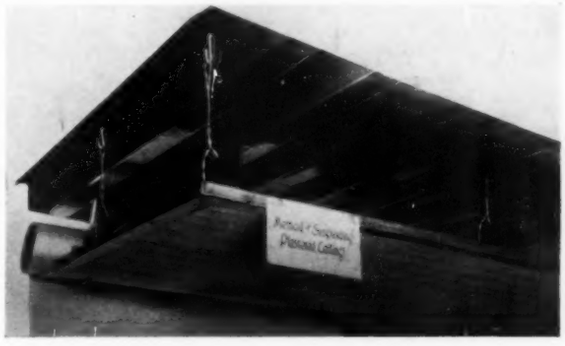


Fig. 8—Method of suspending plastered ceiling.

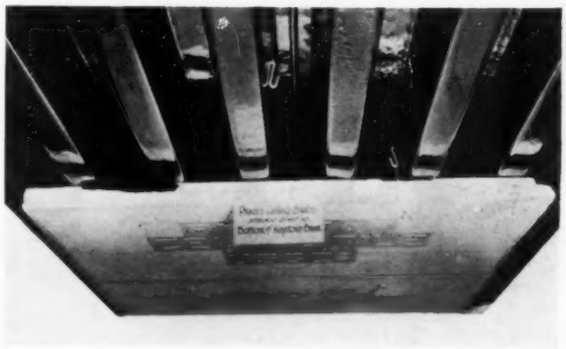
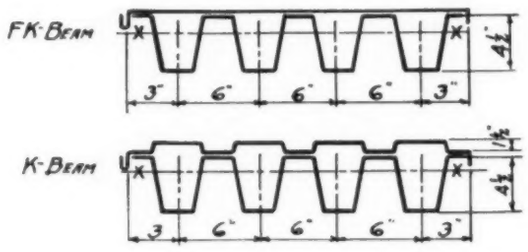


Fig. 9—Method of attaching pre-cast ceiling slabs directly to bottom of steel flooring.

Fig. 10—Method of hanging steam or water pipes.

I is Moment of Inertia.*
S is Section Modulus.*
w is Weight of Beam in Pounds Per Sq. Ft.
c is Distance from Center of Gravity to Extreme Fiber.
C is Coefficient of Strength for Simple Span.*
M is Maximum Moment in Inch Pounds.*
R is Maximum End Reaction for One Cell on a Bearing of 2".
d is Depth of Beam in Inches.
* Values for the 24" Wide Unit.



		FK 16-16	FK 14-14	K 16-16	K 14-14
I	Axis X-X	15.25	19.85	25.06	31.32
S	Axis X-X	5.00	6.73	7.37	8.98
w	Wt. Lb. Sq. Ft.	8.26	10.33	9.39	11.75
c	in Inches	3.05	2.95	3.40	3.49
C	Coef. Strength	53330	71790	78610	95790
M	in Inch Pounds	80000	107680	117920	143690
R	in Pounds	4800	6340	4840	6340
d	Depth of Beam	4.625	4.656	6.125	6.156

To Find the Allowable Total Loads in Pounds Per Square Foot of Floor for Intermediate Spans Not Given Above Heavy Horizontal Lines, Divide the Coefficient of Strength by Two Times the Square of the Span in Feet.

Example: Required the Allowable Total Load in Pounds per Square Foot of Floor for K 16-16 Sheet on 8'-9" Span.

$$\text{Load} = \frac{78610}{2 \times 8.75 \times 8.75} = 513 \text{ Lb. per Sq. Ft.}$$

Span in Feet	Allowable Total Loads in Pounds Per Square Foot of Floor Calculated for Flexual Conditions and the Corresponding Deflections are Shown Above Heavy Horizontal Lines								Limiting Deflections in Inches for the Various Spans—Based on 1/360th of the Span Length
	Load	Def.	Load	Def.	Load	Def.	Load	Def.	Def.
6	749	.101	997	.105	1092	.091	1331	.089	.200
7	544	.138	733	.143	802	.123	978	.121	.233
8	417	.180	561	.186	614	.161	749	.157	.266
9	329	.228	443	.236	485	.204	592	.199	.300
10	267	.281	359	.291	393	.252	479	.246	.333
11	220	.340	296	.352	325	.305	396	.298	.366
12	182	.400	238	.400	273	.363	332	.354	.400
13	144	.433	188	.433	233	.426	284	.416	.433
14	115	.466	150	.466	189	.466	236	.466	.466
15	94	.500	122	.500	154	.500	192	.500	.500
16	77	.533	100	.533	127	.533	159	.533	.533
17	65	.566	84	.566	106	.566	133	.566	.566
18	54	.600	71	.600	89	.600	112	.600	.600
19	46	.633	60	.633	76	.633	95	.633	.633
20	40	.666	52	.666	66	.666	82	.666	.666
21			44	.700	56	.700	70	.700	.700
22					49	.733	61	.733	.733
23					43	.766	53	.766	.766
24							47	.800	.800
U. S. Standard Sheet and Plate Gauge	Top 16-Ga. Bot. 16-Ga.		Top 14-Ga. Bot. 14-Ga.		Top 16-Ga. Bot. 16-Ga.		Top 14-Ga. Bot. 14-Ga.		

Loads Below Heavy Horizontal Lines are Calculated for Plaster Limit Deflections and the Allowable Loads for Flexure Conditions on these Spans will Produce Excessive Deflections.

TABLE A—PHYSICAL PROPERTIES OF THE NEW FLOORING.

The prefabricated unit, readily handled, follows closely the erection of steel framework and keeps pace with it during the progress of construction. It forms a working floor as soon as in place, eliminating the necessity for large quantities of temporary planking and masonry forms, thus reducing fire hazards during erection. The sections, 24 inches wide, are laid across the structural beams, and are either welded, bolted or clipped to supporting members. An elimination of awkward material handling has been accomplished and the floor is ready for the other building trades to work on. The secondary distribution boxes or ducts may be located anywhere in the length of the floor cells, because there is provision for feeding in either direction, and the cross-section of the keystone cell is large enough to make feasible the fishing of wires as far as 150 or 200 feet. For most installations, only one set of cross boxes or ducts is necessary.

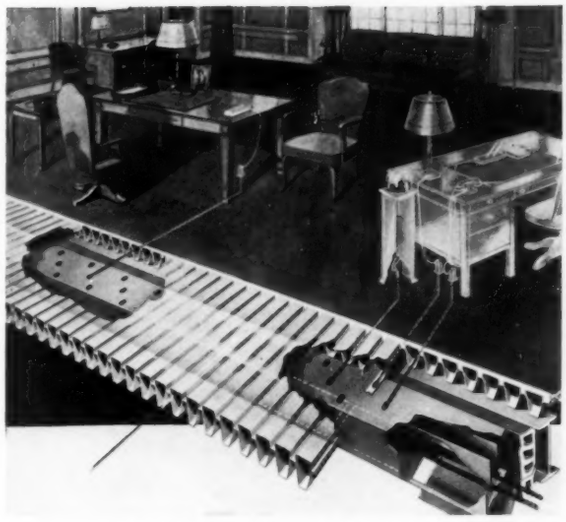


Fig. 11—In this system, the distribution box is located under the floor.

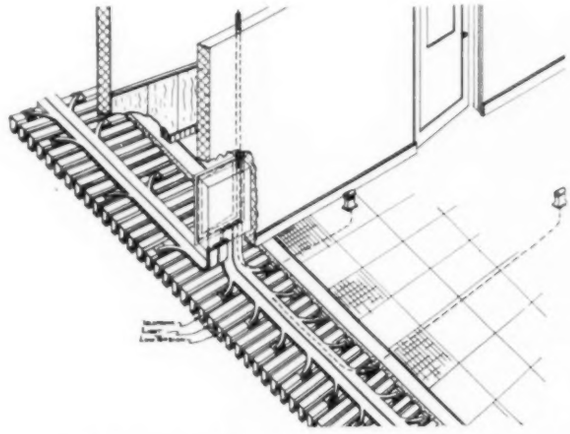


Fig. 12—A system that has many advantages in flexibility and economy. It can be effectively combined with any one of the other four systems available.

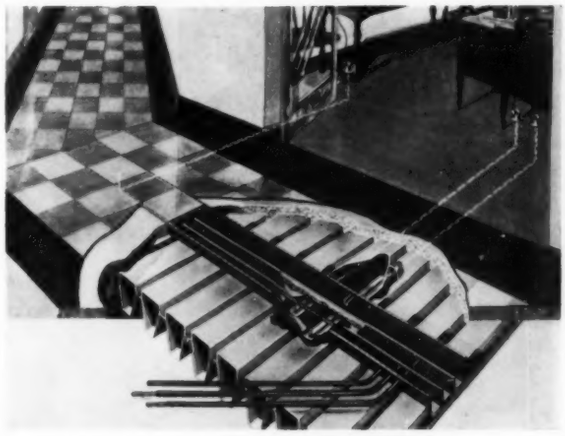


Fig. 13—A system, well adapted to most uses, in which the distribution box is possibly best located in a hallway or corridor to service adjacent offices or suites.

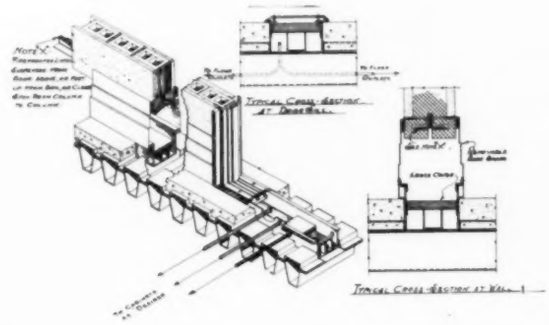


Fig. 14—A system of distribution in which the distribution box is located in a permanent partition wall.

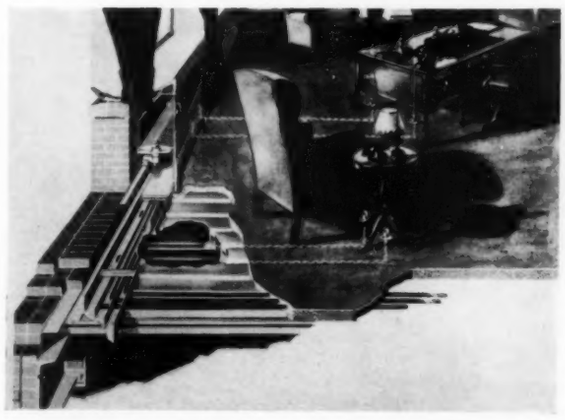
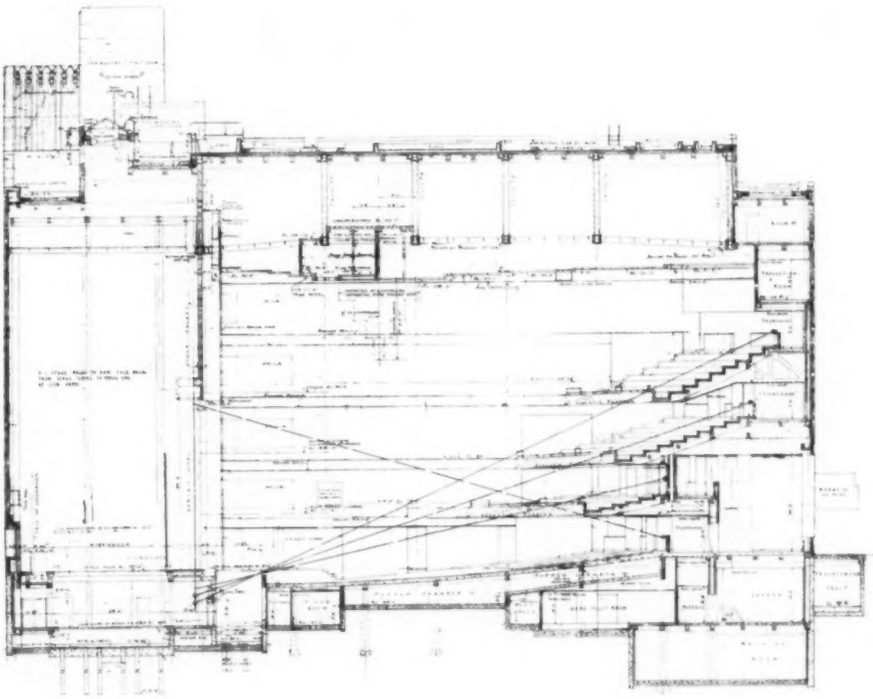
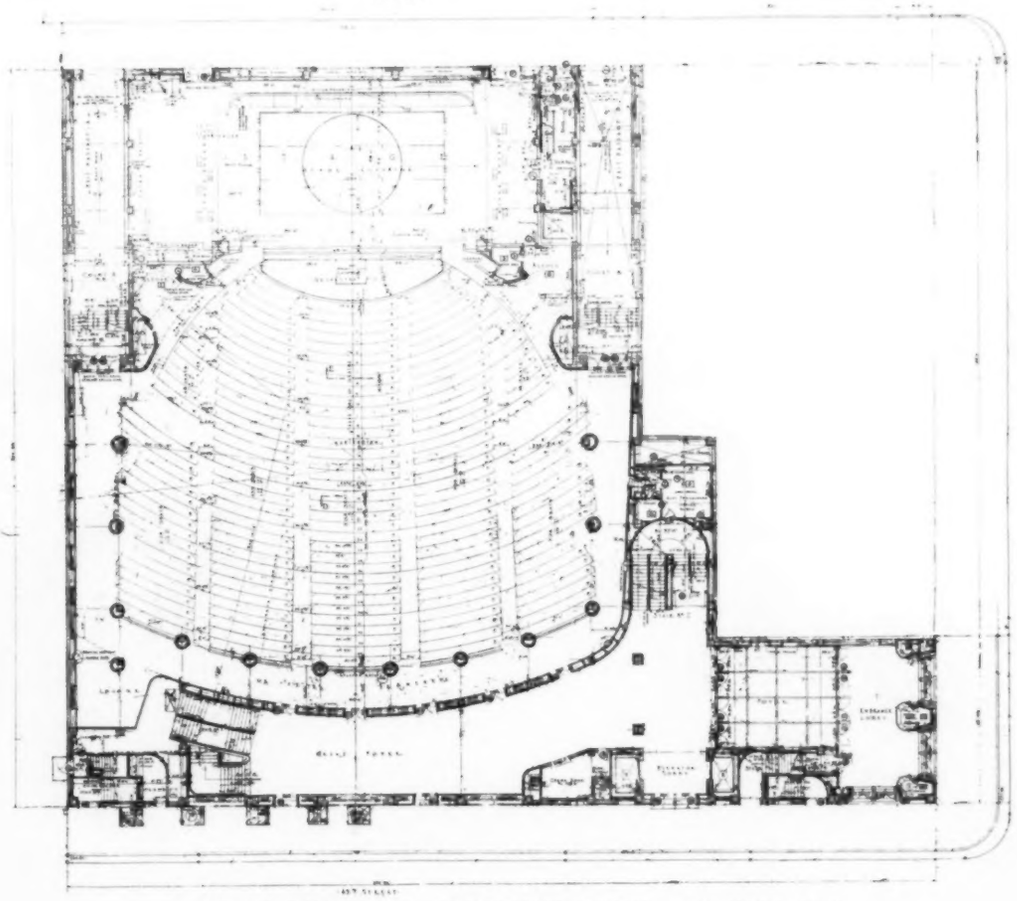


Fig. 15—A distribution system especially adapted to fine office interiors. The distribution box in this system is located beneath a radiator. Note that provision is also made for steam pipes.





SOUND THEATER FOR ROCKEFELLER CENTER, NEW YORK CITY
REINHARD AND HOFMEISTER; CORBETT, HARRISON AND MACMURRAY;
HOOD AND FOUILHOUX, ARCHITECTS

Kilham, Jr.

Model of International Music Hall, showing mezzanine balconies and proscenium arch.

THEATER DESIGNS FOR ROCKEFELLER CENTER

REINHARD AND HOFMEISTER; CORBETT, HARRISON AND MAC MURRAY; HOOD AND FOUILHOUX, ARCHITECTS

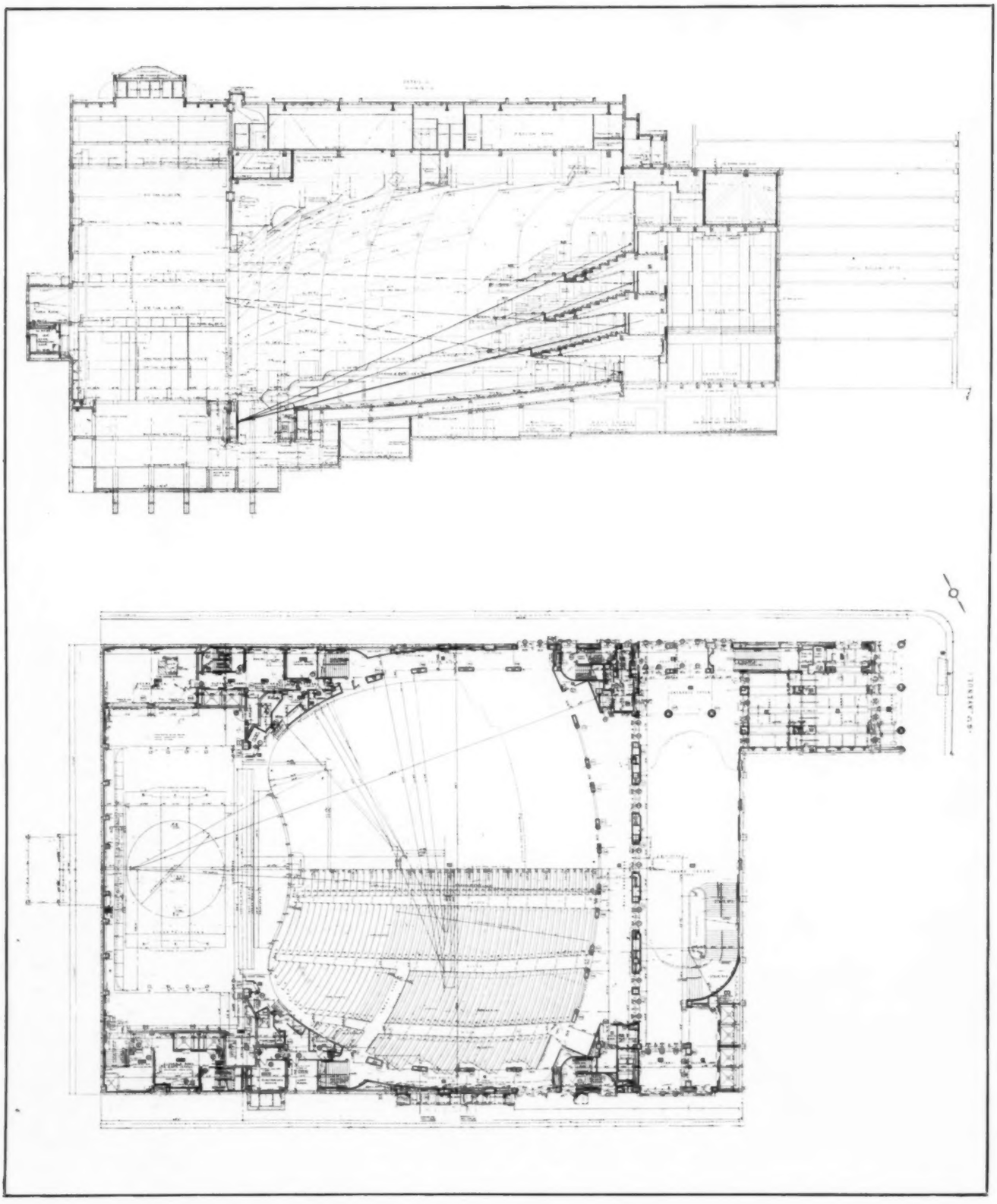
The International Music Hall and the Sound Theater, now under construction at Rockefeller Center, New York City, illustrate a new departure in the design of auditorium balconies. Instead of a single large balcony, three shorter mezzanine floors are used in each theater. These mezzanines, while seating the same number of spectators as in the case of a single large balcony, do not divide the audience into two separate groups as at present. As a result, a greater degree of intimacy between actors and audience is to be achieved in the theatrical performances.

The auditorium of the International Music Hall will seat 6,000 persons. The walls and ceilings are to be acoustic plaster, the floors carpeted and the seats upholstered in a dark red. As shown in the views of the model, the walls and ceiling converge toward the stage proscenium, the step-backs being utilized for indirect lighting. Alternate panels in the ribbed plaster serve as light panels, the openings being covered with a light fabric or mesh, thus diffusing the light from domed reflectors in back.

A flat ceiling is used in the Sound Theater. The walls are constructed of ⅛" mahogany veneer on steel plates.

In both theaters, the lights of the stage and auditorium will be controlled by a lighting director from a small pit in front of the orchestra. Control of all lighting effects, including changes of color, variation in intensity, etc., will be at the finger tips of this man. The equipment, known as Thyratron reactor lighting control, eliminates bulky back-stage theater switchboards and allows the lighting director to take his place in the auditorium where he can see the effects he produces.

The lights subject to this control can be roughly divided into those for the auditorium and those for the stage. Four colors (red, amber, green and blue) will be used in the auditorium lighting alone. The reason for their use is that modern stage productions, no longer confined to the stage itself, have many effects extending into the auditorium. This will be particularly true in the International Music Hall. Runways on each side of the auditorium will be among the architectural features. In the ceiling will be booths housing flood- and spotlights for the orchestra leaders, the orchestra, the organists and the stage. On the stage the color circuits will not only include red, amber, green and blue, as used in the auditorium, but also a daylight color effect involving additional lighting circuits.



INTERNATIONAL MUSIC HALL FOR ROCKEFELLER CENTER, NEW YORK CITY
REINHARD AND HOFMEISTER; CORBETT, HARRISON AND MAC MURRAY;
HOOD AND FOUILHOUX, ARCHITECTS

PORTFOLIO OF THEATERS

FOX
JOAN CRAWFORD AND CLARK GABLE POSSESSED
BOY FRIEND COMEDY KEN WIDENOR AT THE ORGAN
PREVIEW MON AND THUR 10 P M MIDNITE SHOW SAT

Guild

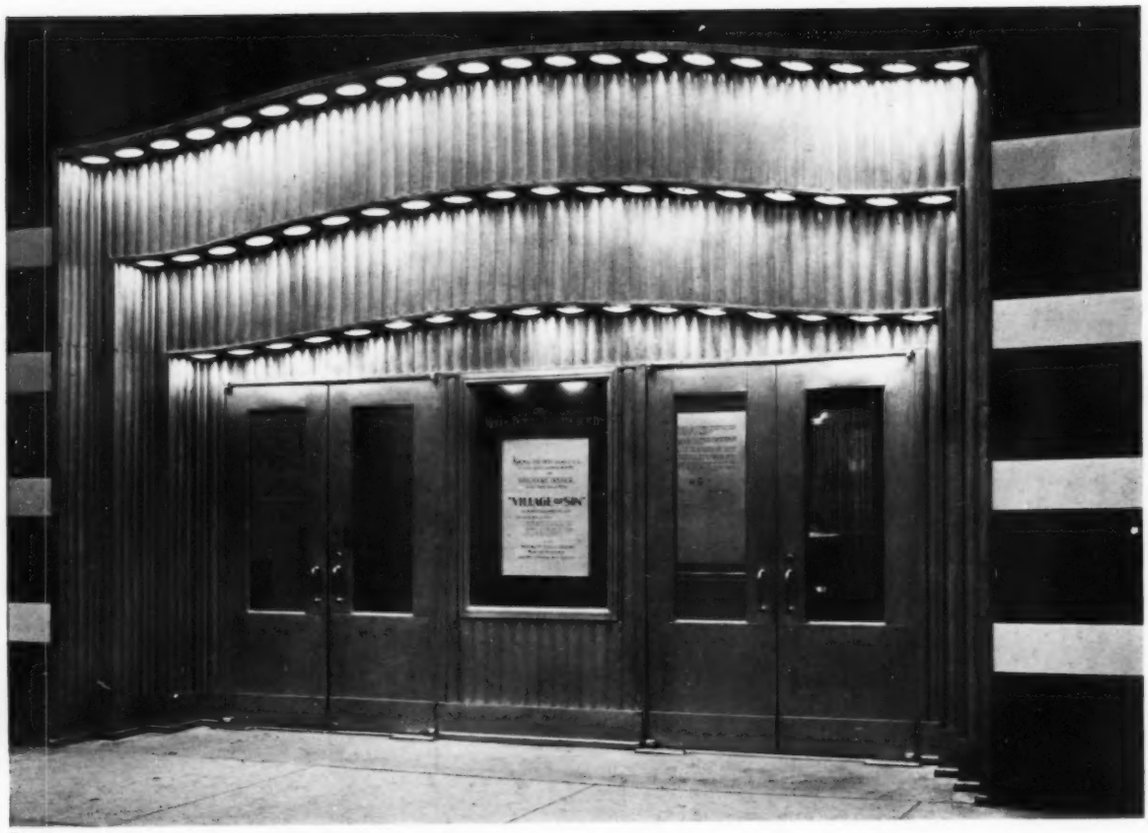
FOX THEATER AT HACKENSACK, NEW JERSEY
THOMAS W. LAMB, ARCHITECT

Chicago Architectural Photographing Co.

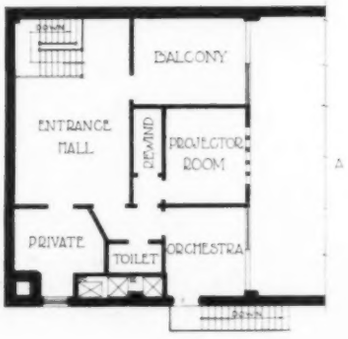
NEW SOUTHTOWN THEATER IN CHICAGO
C. W. AND GEORGE L. RAPP, ARCHITECTS

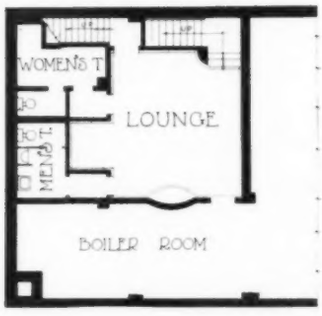
Moulin

PARAMOUNT THEATER AT OAKLAND, CALIFORNIA
J. R. MILLER AND T. L. PFLUEGER, ARCHITECTS

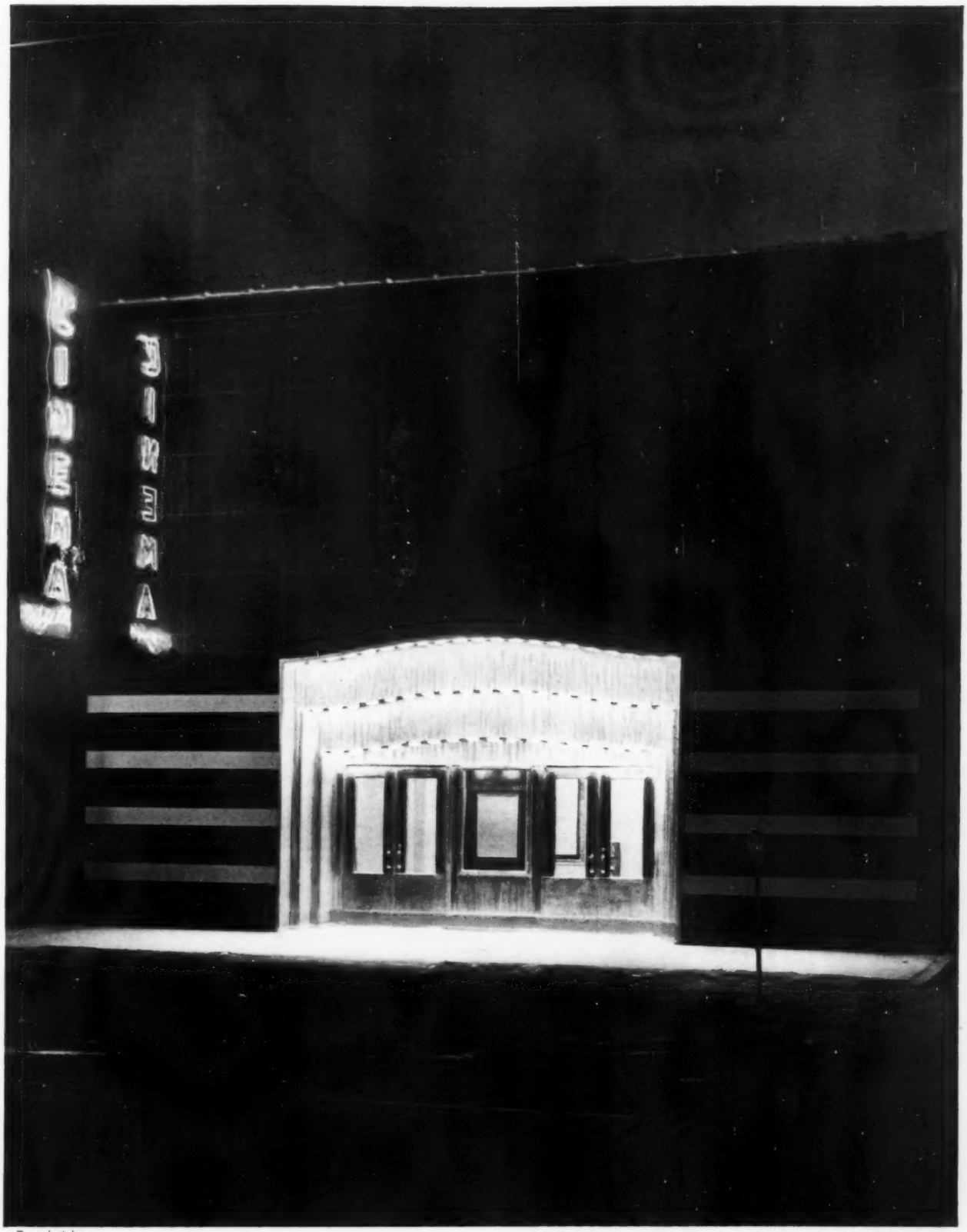


Bowman



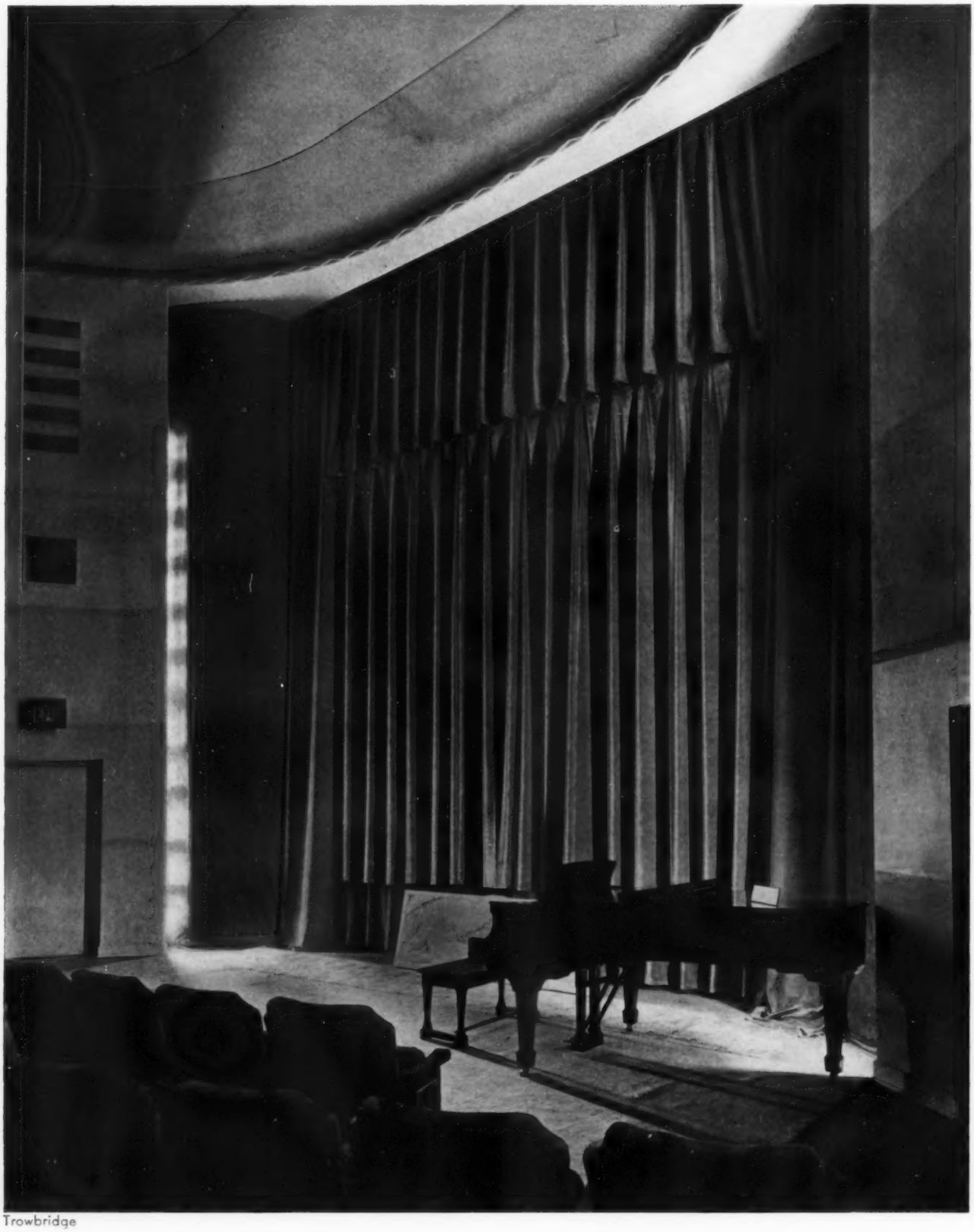


CINEMA ART THEATER IN CHICAGO
ARMSTRONG, FURST AND TILTON, ARCHITECTS



Trowbridge

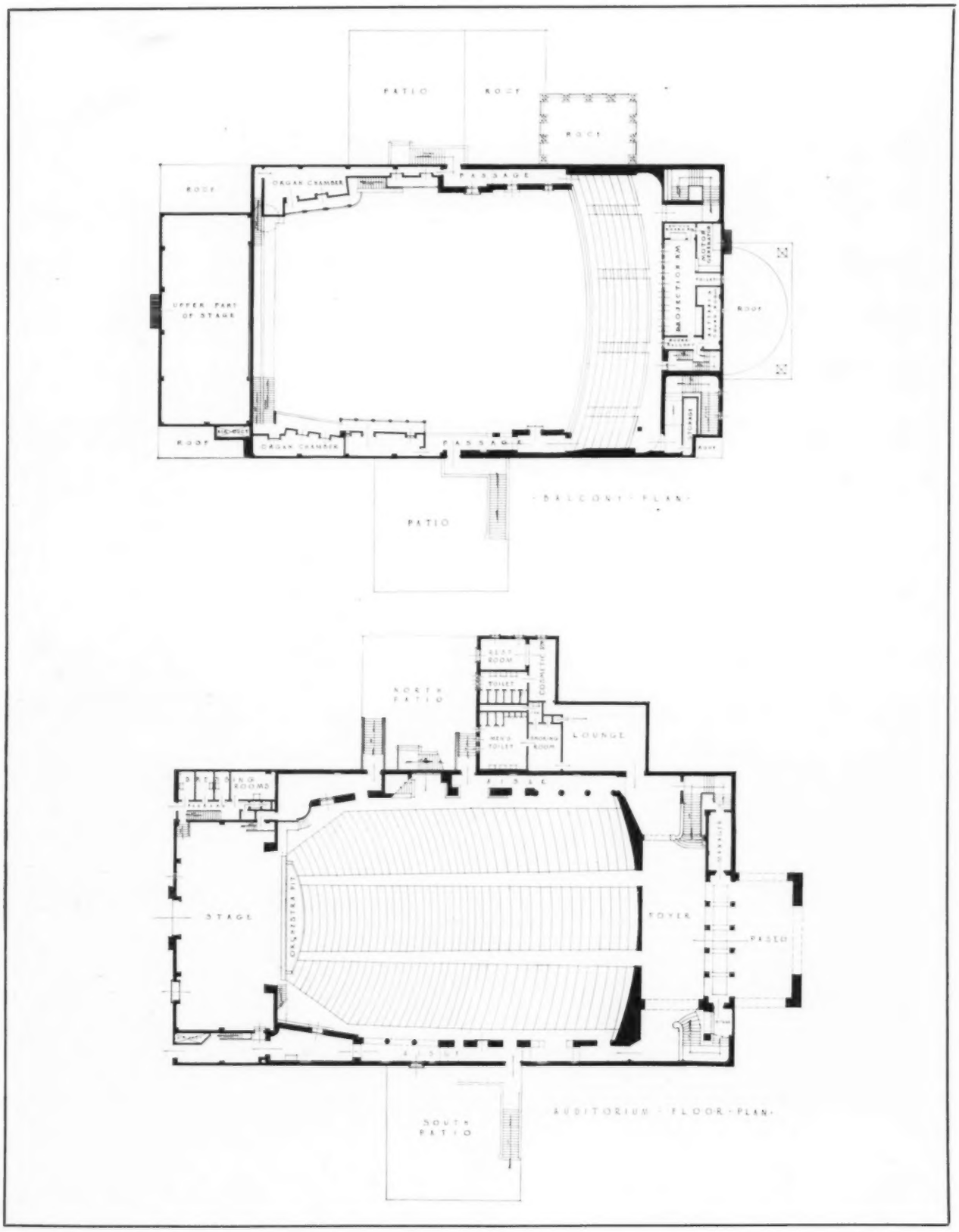
CINEMA ART THEATER IN CHICAGO
ARMSTRONG, FURST AND TILTON, ARCHITECTS



Trowbridge

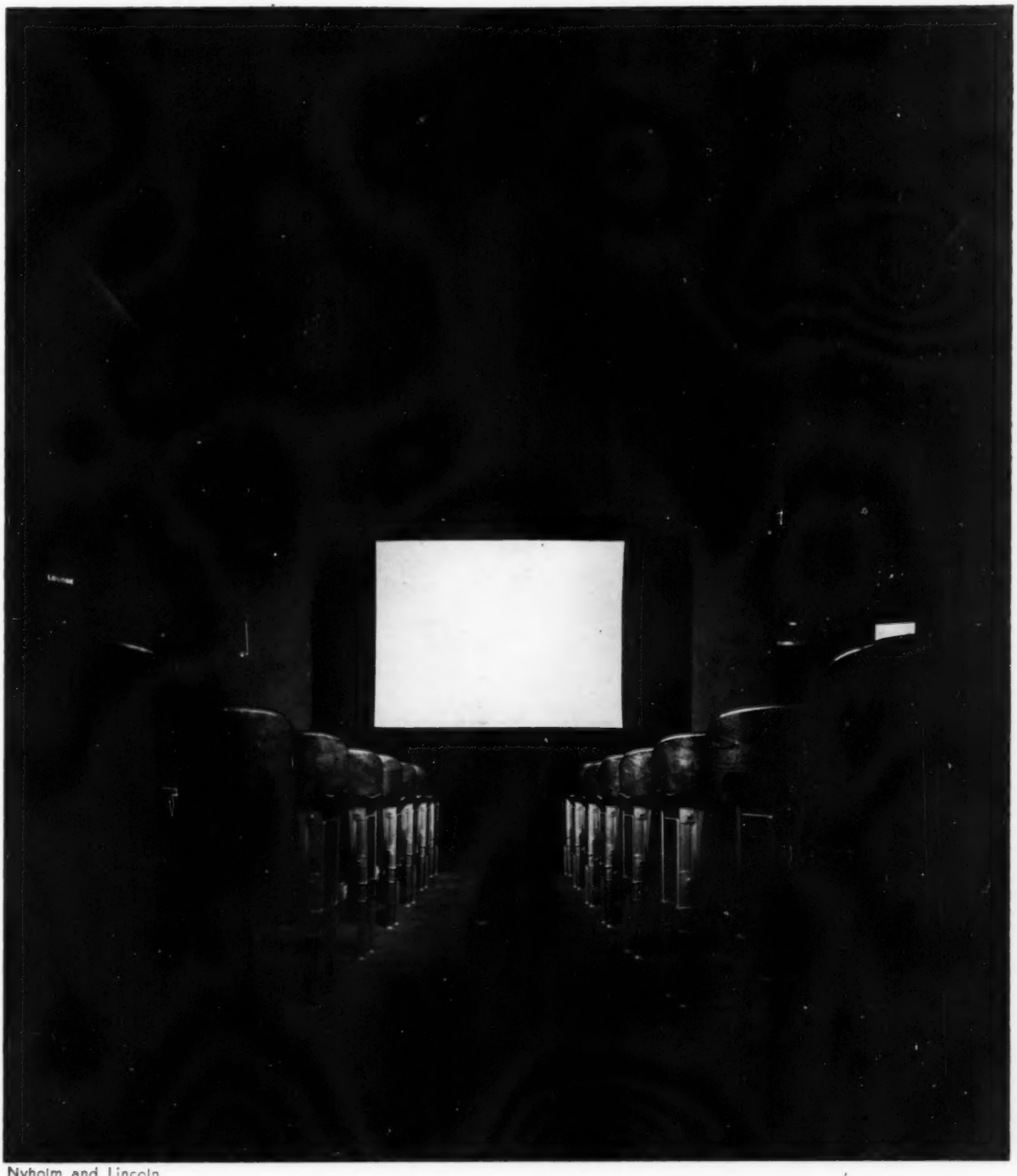
CINEMA ART THEATER IN CHICAGO
ARMSTRONG, FURST AND TILTON, ARCHITECTS

FOX ARLINGTON THEATER IN SANTA BARBARA, CALIFORNIA
EDWARDS AND PLUNKETT, ARCHITECTS



FOX ARLINGTON THEATER IN SANTA BARBARA, CALIFORNIA
EDWARDS AND PLUNKETT, ARCHITECTS

TECHNICAL NEWS AND RESEARCH



Nyholm and Lincoln

TRANS-LUX THEATER, NEW YORK CITY — HOWE AND LESCAZE, ARCHITECTS

DESIGN OF MOTION PICTURE THEATERS

By FREDERIC ARDEN PAWLEY

This article continues the studies of building types and construction methods presented each month in this Technical News and Research series. Other theater studies have appeared in May and July, 1930.

DESIGN OF SMALL MOTION PICTURE THEATERS

Courtesy BETTER THEATRES

Many new theaters show an increased use of mechanical aids and extra-income accessories: note the turnstile, the photoelectric automatic door and the soft drink stand.

STUDIO THEATER, LOS ANGELES — S. CHARLES LEE, ARCHITECT

Two essential differences distinguish the design of the motion picture theater from the legitimate theater:

(1) In the motion picture theater the attention of the audience is focused not on a 3-dimensional stage but on the screen, a fixed plane of two variable dimensions. This simplifies and definitely separates the problem of cinema sight lines from those of the stage theater, since the screen, which confines the dramatic action to a limited area, can be adjusted to any desired position. The objection of "stage obstruction"—the interference of sight lines between the spectator and the stage which is caused by incorrect curvature of the auditorium floor and the depth of the stage itself—is not as important as it is in the case of regular theater design, since the screen may be raised.

(2) The continuous flux of a changing motion picture audience makes necessary a seating plan which facilitates audience circulation. Aisle arrangements are of particular importance.

In the past, motion picture theaters have developed from conventional theater forms without consideration of special needs. In recent years there has been an increase in the number of small, intimate picture houses presenting news events and movie shorts. These small theaters require specialized planning and design.

THE SCREEN

Types and Characteristics

Various types of screens are available, according to Francis M. Falge, at present with research division at Nela Park, Cincinnati, in a paper presented before the Society of Motion Picture Engineers and reprinted in "Motion Picture Projectionist."

(1) *Diffusive or matte:*

Made of cellulose-coated materials.
Rubberized fabrics, closely-woven treated materials.
Coarsely-woven materials with or without metallic fibers.
Woven materials with irregular glass particles.
Coated metals.

Advantages:

A large percentage of light efficiently redirected.
Non-selective as to colors, which is good for color-picture projection.
Light redirected through wide angles, thus giving a satisfactory projection for wide theaters or for theaters with steep projection angles.

(2) *Reflective or metallic:*

Made of aluminum and other coated and polished materials with varying degrees of diffusiveness.
Finishes range from smooth to heavy-pebbled surfaces: the smooth has perpendicular reflective characteristics while the pebbled diffuses light somewhat and is better for wide theaters.

Advantages:

Intensity of reflected light is built up so that under certain conditions there is an apparent brilliancy as viewed from rear seats.
Economies in projection are obtainable in theaters with large ratio of length to breadth.

Disadvantages:

This screen is undesirable where angles of projection are greater than 10°.
It is color selective and therefore not satisfactory for the projection of colored pictures.

(3) *Directive or beaded:*

Diffusing screens in which are embedded glass globules.

Advantages:

Intensity of reflected light is built up, thus giving a more brilliant picture from seats in rear of theater.
Light is redirected in such a manner as to make the view of the screen image as desirable in the balcony as on the orchestra floor.
Economies of operation are effected.
Illusion of third dimension is assisted.
Easy maintenance allows much of original brilliancy of screen to be retained.
Glare seen from seats near screen is reduced.
Apparent brightness adds brilliancy to color pictures.

Disadvantages:

Screen not desirable for theaters with projection angles greater than 20°.
Likewise not desirable for wide houses.

These screen types are made with perforations or of porous material for the passing of sound from horns of loud speakers located in rear. In addition to these commercial screens there are special patented types such as the Trans-Lux or "daylight screen," which is for rear projection only. The Trans-Lux auditorium may be more highly illuminated than is possible with other screens or methods of projection. Developments of stereoscopic methods are not yet commercially practicable; these may require comparatively different types of screen and projection.

Placement of Screen

Determination of the distance of the screen from the front row of seats is the chief consideration in placing the screen. It is desirable that a clear view of the screen be obtained from all seats in the house. This desideratum becomes particularly difficult of attainment with those seats at the sides and in the balconies. The screen placement is also dependent on the size of the picture desired; the grain of the picture becomes distracting if the frame size is too large when viewed from the front row of seats. A rule suggested by F. M. Falge is to allow a depth of at least 15" for each foot of screen width, based on a comfortable visual angle of 45° in the horizontal plane. Some other authorities accept a maximum angle of 60°, which allows proportionally less depth for the screen width.

In designing theaters requiring a conventional stage, the screen should be kept as low as possible with a maximum of 18" clearance above the stage floor in order to preserve the illusion of realism. This distance is further limited by the lower sight line from the first row of seats which clears the projecting stage apron and orchestra pit.

If the stage apron extends too far into the range of vision, the view of the screen is obstructed.

The alternatives for correction are:

(a) Raising the screen, or
(b) Moving the screen forward and also changing the position of the first row of seats so as to preserve the desirable distance between the two.

The logical procedure is definitely to locate the screen for cinematic projection and sight lines before introducing the framing and stage elements.

Tilting of screen is sometimes necessary in the case of silver screens in order to redirect the light to best advantage. Other types of screen have been

Courtesy BETTER THEATRES

Entrance under marquee, exit under tower.

NEW SOUTHTOWN THEATER, CHICAGO

C. W. AND G. L. RAPP, ARCHITECTS

tilted to overcome the keystoning effect (perspective distortion) due to a large projection angle, but in general tilting should be restricted only to silver screens. The tilt attracts greater dirt deposit, which a metallic surface is better able to shed.

Size and Proportion of Screen

At present, screen sizes have not been standardized. Many new processes of production and projection, some of which, like "Grandeur," "Reallife," have already been tried and either abandoned or postponed for future development, indicate enlarged motion picture screens. These maximum-size screens give more flexible play of scale of images, objects and backgrounds in relation to size of spectator. It is also considered desirable to be able to alter the proportion and shape of images at will for dramatic effect.

Generally, the screen's shape is dependent on selection of a rectangle which offers the most satisfactory proportions. The viewer should be able to focus on the screen composition without being conscious of its frame. The shape should be such as not to force the head of the spectator to move when following action or details displayed on the screen.

The present screen proportion is 3 (height) to 4 (width). The objection to this size is its accentuation of vertical effects. A possible wider screen, with a proportion of 5 : 9, is considered undesirable for its horizontality. A screen with a proportion of 3 : 5 has been proposed by various authorities. This will permit both horizontal and vertical directions to be well balanced for picture composition, and it can be modified to achieve any desired shape without causing too great a reduction in the picture size, a factor which is not true of the 3 : 4 and 5 : 9 proportions.

Interrelationship exists between the form of the auditorium and the size and proportion of the screen, as Ben Schlanger, New York theater architect, has pointed out.

The screen size and its proportion determine:

(1) Proper shape of auditorium.
(2) Floor slopes and pitches.
(3) Seating arrangement and chair back pitches.
(4) Lighting and architectural composition.
(5) Indirectly, the acoustical form of the theater structure.

The size of the screen, in turn, is ultimately dependent on:

(1) Dimensions of the theater structure.
(2) Distance from the rear seats.
(3) Distance sacrificed between screen and first row of seats.
(4) Shape of screen.
(5) Location of balcony.
(6) Width of motion picture film (at present 35 mm., although a 50 mm. film width is

being considered; 70 mm. for Grandeur film.)

(7) Projection lens size.

(8) Length of throw from projector to screen.

Present screen sizes are determined by the sight line characteristics of the seating arrangements in each particular theater; these usually limit the size to a much greater extent than do the actual dimensions of the structure.

The shape of the screen also governs its size. The height of the theater structure at the screen point is usually an optional dimension, whereas its width is generally fixed by the limits of the theater property. Therefore, if the screen should be made much wider than it is high, its height would be noticeably limited in theaters which are not very wide.

It is usually difficult to install large screens in existing theaters. There may be sufficient space in the proscenium opening, but balcony obstructions and unsuitable floor slopes would give poor sight lines for large screens, especially when viewed from extreme rear seats or from the sides.

Framing of Screen

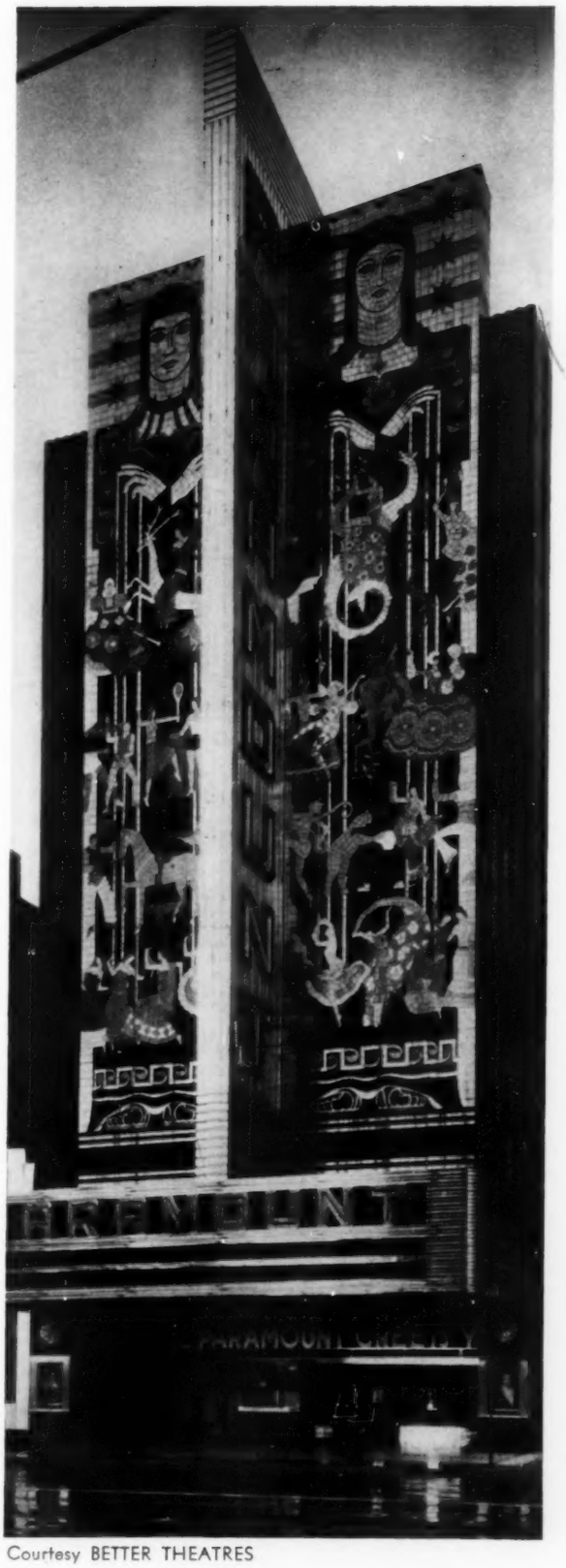
Motion picture screens must be framed with masks or borders which will absorb any light spilling over the edges, and thus minimize any visibility of motion of picture at the edges of the screen.

The usual procedure of absorbing light at the edges is a mask of black velvet stripping, 3″ - 4″ wide, next to the screen, framed in turn by a 2′ - 3′ border grading to the predominant surrounding color. The contrast between the lighted picture and the black border is usually too great, subconsciously attracting the eyes to the frame rather than to the picture image, and the attention-effort results in eye fatigue.

Inasmuch as the tone of the picture image next to the surrounding frame varies a great deal, it seems desirable to have a light-absorption mask which is also variable. More research is necessary on this point.

In the Thalia Theater in New York, a recessed mask, designed by Ben Schlanger, is used. This device decreases contrast, spilled light and movement visibility, both because of greater distance of the mask from the eye and also because of the haze of light (which may be colored) projected from the wings into the area formed by the recess. The haze of light and the recessed mask assist an illusion of the third dimension for the screen image by isolating the screen from the structure and affording an impression of undistracting space in which the action unfolds. Modifiers, technical devices now on the market, are masks remotely controlled, which permit rapid framing of the screen to any desired size.

The architectural treatment at sides and top of screen should be simple and flexible. A directional arrangement of planes or curved surfaces is preferable to a rigid, over-decorated proscenium.



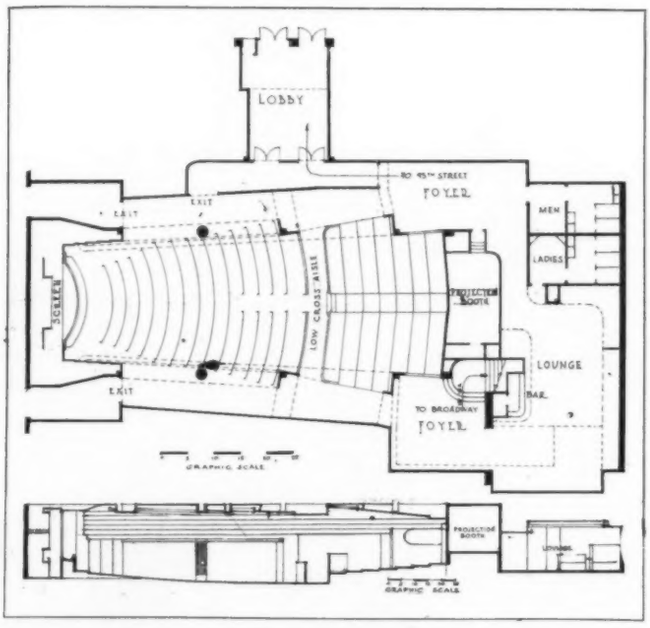
Courtesy BETTER THEATRES

Entrance sign is visible from all directions.

PARAMOUNT THEATER, OAKLAND, CALIFORNIA

MILLER AND PFLUEGER, ARCHITECTS

Keystone-Underwood



THALIA THEATER, NEW YORK CITY
BEN SCHLANGER AND R. IRRERA, ARCHITECTS

First theater to use parabolic reversed floor described in this article; note good location of projection booth, easy sight lines and recessed screen mask.

Projection

Although it is possible to project pictures on the screen from a booth, placed high in the rear of the auditorium, so as to cause a projection angle of 30°, an unnecessary distortion of the screen image results.* Balconies also become less desirable because of the steep inclines and the relatively great height with respect to the screen. Since the physical comfort of the patrons is desirable—this factor affects box office—it is essential that such difficulties be overcome.

* 30° is 12° above maximum angle advisable.

PLANNING OF SEATS AND AISLES

Two recent papers, presented before the Society of Motion Picture Engineers by Ben Schlanger, architect, analyze a new structural form intended purely for motion picture exhibition under the best conditions. This form affects the present design of floors: it is arrived at by reversing the slope of the orchestra floor, by raising the position of the screen, and by adjusting the seats to the new angle of vision. The balcony pitch is also reduced, thus economically reducing the height of the structure and affording a more comfortable view of the screen from all seating levels. The plan also adapts itself more readily to the enlarged screen than does the present type of theater and allows for improved projection and acoustics.

Excerpts from Mr. Schlanger's two papers* follow:

"Sight lines, as now fixed in the present type of theater, cause the spectator to sit with much bodily discomfort and frequently with a distorted view of the screen. On the orchestra floor level, the present arrangement requires (except at the extreme rear of a deep auditorium) that the spectator tilt his head backward to see the upper portions of the screen, the amount of tilt reaching a somewhat painful degree. This is due to the fact that the chairs are placed on a floor that is sloping downward toward the screen, the level of the floor being, in most parts, about even with the bottom of the screen. Thus the pitch of the orchestra floor is directly opposite to the pitch the body should assume for comfort. In the balcony, the steep angle makes it necessary for the patron to pitch his body forward in order to view a screen that is at a level which is in most cases below that of the greater part of the balcony. Study has shown that it is impossible to correct these faults without entirely disregarding the present theater forms and creating new ones.

"In endeavoring to correct the faults of the present type of orchestra seating, the author has developed a plan in which the slope of the orchestra floor is reversed, bringing the high point of the floor nearer the screen instead of the low point as is now the case in the present type of theater. The screen is raised a prescribed distance above the level of the eye line of the first row of seats nearest the screen. This plan includes a systematic tilting of the backs of the chairs on the reversed orchestra floor slope. By tilting the body backward and permitting the higher part of the floor in front of the seat to support the feet, a natural and comfortable position is assumed which allows the spectator to obtain a complete view of the screen without having to raise his head from its natural position. Seats on the orchestra level more remote from the screen require less tilt. The various distances from the screen control the lessen-

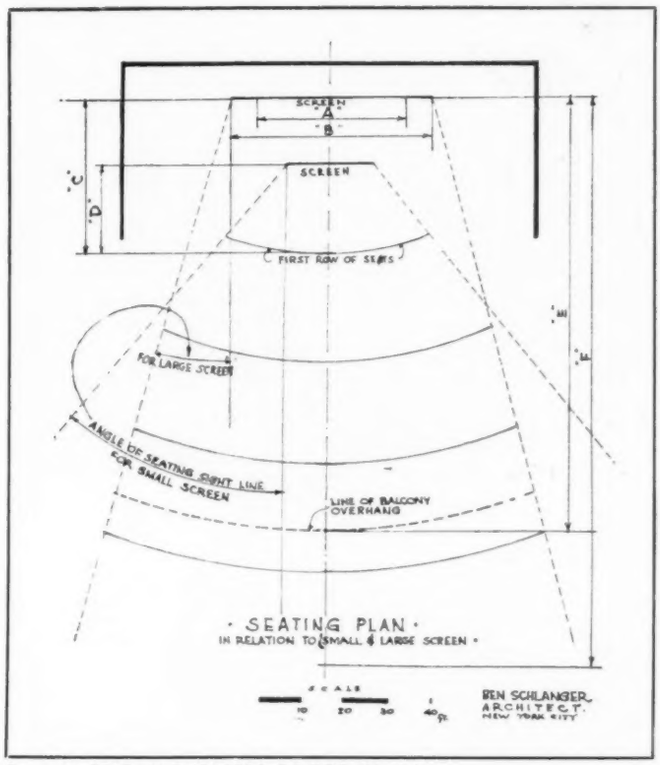
* Reprinted from Journal of the Society of Motion Picture Engineers, August, 1931, and February, 1932. Designers are cautioned against using parts of this scheme since the originator's adjustments of dimensions are delicate; poorly applied they do not result in proper sight lines.

ing of the tilts of the backs of the chairs. The angle of tilt in each case is perpendicular to a line of sight drawn from the eye level to a point on the screen about one-half the height of the screen, measured from the bottom. It is at this height of the screen where most of the action takes place and where the spectator's eye is chiefly focused. The angle formed between the back of the chair and the seat is 98 degrees and is kept constant for each and every chair. This angle has been found to be most conducive to correct and restful posture. Heretofore, only the placing of the seat and the screen were taken into consideration in determining sight lines, the matter of posture being entirely disregarded. Realizing that variously inclined surfaces are used in theater structures, it seems almost incredible that more consideration was not given to the inclination of the chairs. The reversed slope of the orchestra floor permits establishing a definite relation between the inclination of the floor and the seat, and the position and size of the screen. It would be impossible to apply this system of tilting to the present slope of the orchestra floor because the proper angle of the seat with respect to the back of the chair could not be maintained without leaving the feet unsupported. Sight lines from the orchestra level cannot, therefore, be improved for screen entertainment unless the slope of the orchestra floor is reversed.

"While this arrangement distinctly improves the orchestra seating, it also serves as a means by which the complete form of the theater may be revised to suit the requirements of screen performance. The faults of the present orchestra seating are greatly magnified when the enlarged screen is used because the spectator then has to tilt his head backward even further than is now necessary with the small screen. And so the enlarged screen has also served as an important agent in determining a new form for the theater structure.

"Reversing the slope of the orchestra floor also brings many decided advantages to the balcony, which can now be kept low and of a slight pitch, made possible by the low point of the rear of the reversed orchestra floor. The balcony thus becomes more desirable for two reasons: (1) due to the fact that the level of the screen is very much the same as that of the balcony the sight lines are greatly improved and, (2) direct and easy access to the balcony from the street level is provided, the difference in levels being surprisingly small. This is made possible by the low position of the balcony which is much less steep in pitch than the present type.

"Although the requirements of good acoustics and motion picture projection might have been secondary considerations in this instance, they were by no means disregarded. The shape of the auditorium, as developed from this new disposition of sight lines, lends itself to greater flexibility for better acoustic forms and provides for a smaller angle of projection than the shape of the present



From AMERICAN THEATERS OF TODAY, Vol. 2.

Fig. 1 — Seating plan diagram suggesting how width and depth of theater auditorium, using the large screen, may be determined. "A" is the screen width enlarged for standard use. "B," being wider, allows for a screen whereon can be projected special large scale effects. If possible, most theaters should be able to accommodate this "B" screen size.

type of theater. The projector is lowered to a level almost even with the top of the screen.

"Fig. 1 shows the maximum angle of vision as 108 degrees in relation to the screen. Seats placed outside this angle would afford a distorted view of the screen. The smaller screen permits a more obtuse angle of vision, which accounts for the fan shape of many existing theaters.

"The practicability of applying the reversed floor principle to variously sized and proportioned plots of ground has been given special attention, the object always being to obtain a maximum number of 'good' seats within a minimum area. Many different adaptations of the reversed floor principle have been devised to fit the peculiar conditions of various theater projects. The feasibility presents itself of placing a part or the whole of a theater auditorium above or below the portions of a structure which may be used for other purposes. It therefore becomes important to design a theater auditorium so that it will not require too much valuable area in the vertical sense. Thus, the remaining portions of a structure above or below the theater may provide an additional income which, in turn, results in a reduced rental for the theater itself. The use of the reversed floor permits con-

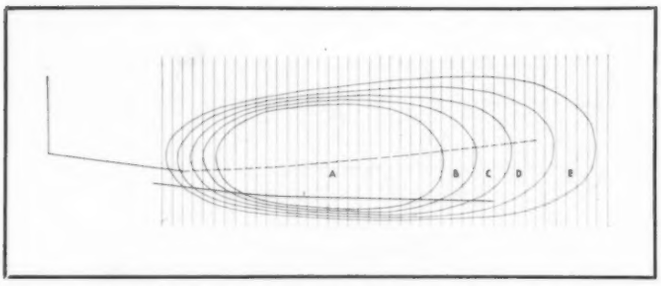


Fig. 2—VALUABLE AREA CHART, showing choice areas for location of seating. Area "A" is the most desirable, "B" is less desirable. Bodily comfort, visual fatigue, acoustics and accessibility of seats are the controlling factors used to plot these areas. Dotted line indicates conventional floor slope—full line, the reversed floor.

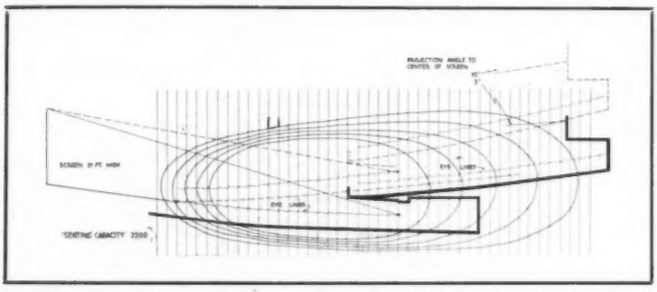


Fig. 3—One of the many theater forms designed within the areas indicated on the valuable area chart, using the reversed floor slope principle. The balcony commands a good view of the screen, and it is above an area which can be used for other elements, such as a lobby or stores. Ben Schlanger, architect.

structing a theater within a limited height, where it would be impossible to include a theater planned according to present practices.

For the purpose of making possible better vision, smaller projection angles, and reducing the cubage of the theater structure, a very intensive search has been made to ascertain which of the physical areas are most valuable as seat locations in relation to the screen, the object being to use these areas only for seating arrangements. The present system of theater planning necessitates the utilization of portions beyond these valuable areas, thus causing large projection angles, distorted vision from high balconies, unnecessarily large construction costs, and the payment of excessive rentals for space which not only has no value to the exhibitor, but which also creates conditions highly unsuitable for motion picture exhibition. For these reasons the present method of theater planning results in unscientific and uneconomically built structures. If original construction and maintenance costs can be reduced, at the same time giving to the theater patron the comforts and surroundings due him, there is little doubt as to what the effect on the box-office will be.

"A chart showing the location of the desirable areas has been developed (Fig. 2). These areas have been found by determining how much above and below, and how far from and how near a fixed screen, a spectator may sit, maintaining a comfortable bodily posture, and obtain a view of the entire screen. The spectator should be seated in such a position that the picture on the screen will appear at a level which is most imitative of the level from which natural surroundings are viewed in real life. Still another determining factor in locating these valuable areas is that it is more natural to sit low and lean slightly backward against the support of the chair back to obtain a higher view, than it is to sit high and lean forward to look down at a screen below the eye level. For these reasons, therefore, the desirable areas of seating are limited to levels below the top of the picture. While both the reversed orchestra floor slope and the present orchestra floor slope come within the desirable areas, the present slope of floor, which rises up away from the screen, causes all *upper* levels of seating to come within the areas undesirable for natural and comfortable viewing. The reversed orchestra floor slope has a much smaller pitch downward than the present type of floor has upward. The present type of floor eats into the valuable areas unnecessarily, while the reversed floor hugs the lower region of the desirable areas, leaving the remaining valuable areas for additional seating levels.

"A method of adjusting the level of the screen, the levels of the various eye lines, the distance between the eyes and the screen, the slope and inclination of the various levels of seating, and the pitches of the backs of the seats has been developed, keeping a definite relation between all the elements involved. Formulae have been evolved to define the position of the screen in relation to the slopes required for the orchestra and balcony levels. The shape and size of the screen are also a definite part of the calculations. Given the shape and size of the screen, and the distance between the screen and the nearest seat (which should equal the width of the screen, for perfect horizontal vision), the vertical distance between the level of the nearest seat and the level of the bottom of the screen is determined. This distance determines the slope of the orchestra floor and the pitches of the chair backs. The resultant slope is a parabolic curve which starts near the screen with a downward pitch, decreasing uniformly until the floor is practically flat at about the twenty-fourth row of orchestra seats.

"The slope of the orchestra floor in existing theaters is not sufficient to permit seeing the bottom of the screen over the head of the person immediately ahead. If the pitch were sufficient for this purpose, it would be too great for comfortable walking, and would make it difficult to adjust the standards and leg supports of chairs to the slope of the floor. The mild pitch of the reversed floor necessary to allow full view of the bottom of the screen eliminates these difficulties. A comfortable, full view of the entire screen can not be obtained until the ninth row of the present orchestra

Trowbridge

LOUNGE IN CINEMA ART THEATER, CHICAGO
ARMSTRONG, FURST AND TILTON, ARCHITECTS

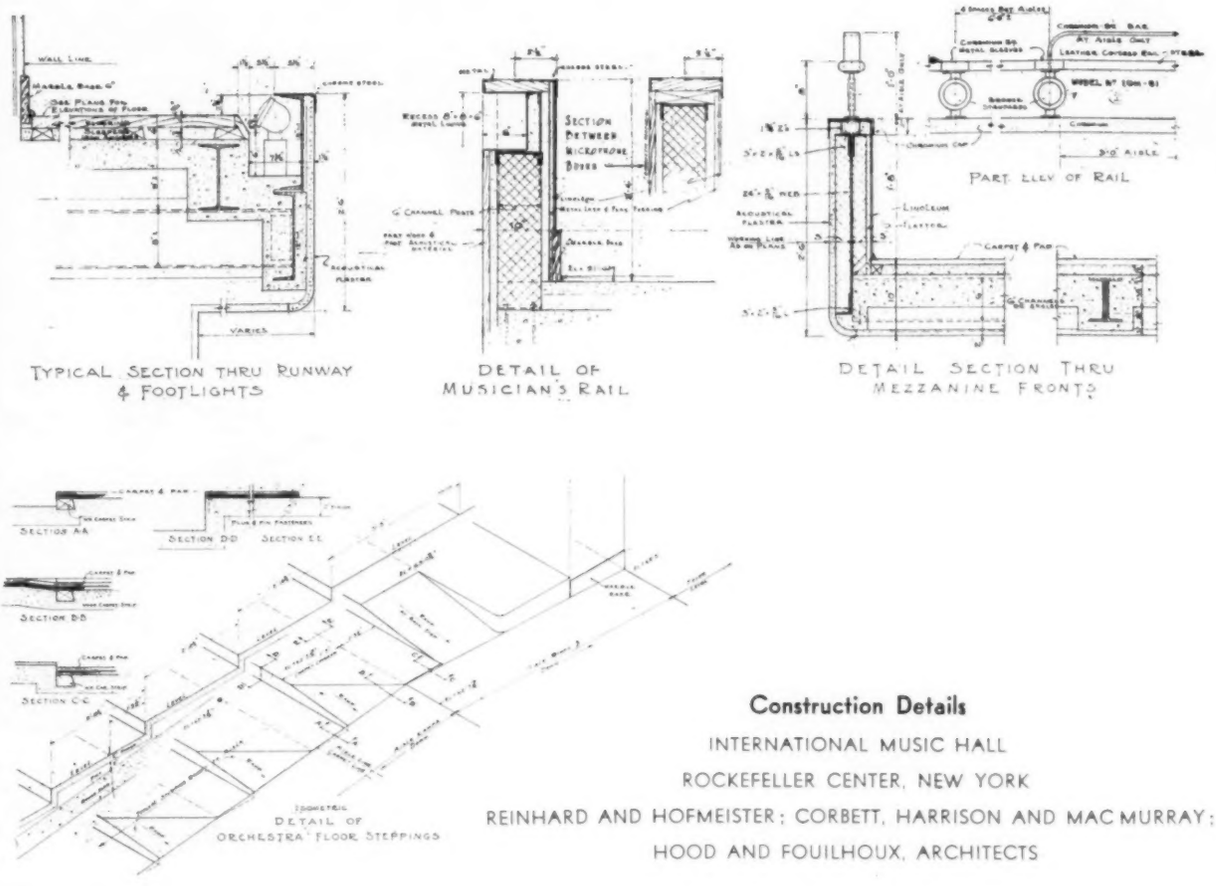
floor slope is reached, causing severe neck- and eye-strain in about 300 seats in the average theater. The reversed floor corrects this condition entirely, allowing a comfortable view from every seat in the orchestra and higher levels.

"The slope of the reversed floor automatically establishes the proper pitch for the backs of the seats in every row. This eliminates the need for specially adjusted backs, and changes in the standards and leg supports of the chairs. All chairs can then be exactly alike in every detail of construction. Instead of designing differently constructed seats to fit a floor slope, as is now necessary, the floor is designed to suit uniform seating. It is just as though the seats were placed in an ideal position for viewing the screen, the floor being built afterward to support the seats in the proper manner.

"The matter of determining the maximum tilt for chair backs has been discussed with the engineering department of a leading seating company. A tilt of twenty-seven degrees for the row of seats nearest the screen has been suggested. This tilt will equally distribute the weight of the body to the seat and back of the chair, keeping the head of the spectator in a comfortable position. The tilt diminishes to sixteen and two-thirds degrees at about the twenty-fourth row, remaining constant thereafter. The fact that the head assumes a pitch of two or three degrees less than the pitch of the body has been taken into consideration in the calculations for determining the floor slope. The feet of the occupant of a seat are properly supported, and the sensation of sliding forward out of the seat, as experienced in the present type of orchestra seating, is eliminated, because the angle and distance between the floor and the seat remain constant. Due to the fact that the same chair can be used unchanged throughout the house, a considerable economy can be effected. The 'spring edge' seats, required where the present type of floor inclines steeply from the front of the chair, are costly and unsatisfactory, and can be eliminated. The reversed floor permits the use of the 'box spring' seat, which is less costly and more durable. The uneven wearing of the seats and backs of chairs is also corrected by equally distributing the weight of the body by properly tilting the seats on the reversed floor."

In commenting on the reversed floor slope advocated by Mr. Schlanger, Mr. George Schutz, Editor of "Better Theatres," makes the following criticism:

(1) The comfort of the patron is increased, sight lines are improved and, because fewer stairs are required, there is greater ease of access.
(2) Simpler seating control results since practically all seats are equally desirable and may have a single admission price.
(3) A large screen is accommodated, the intro-


TYPICAL SECTION THRU RUNWAY & FOOTLIGHTS
DETAIL OF MUSICIAN'S RAIL
DETAIL SECTION THRU MEZZANINE FRONTS
DETAIL OF ORCHESTRA FLOOR STEPPINGS

Construction Details

INTERNATIONAL MUSIC HALL

ROCKEFELLER CENTER, NEW YORK

REINHARD AND HOFMEISTER; CORBETT, HARRISON AND MACMURRAY; HOOD AND FOUILHOUX, ARCHITECTS

duction of which would accentuate faults in theaters in which the sight lines for small screens are defective.

(4) The balcony is brought within the valuable seating area. The additional balcony seats more than offset the loss in front-row seats in the orchestra, which must be removed to permit introduction of large screens.

(5) Angle of projection is decreased.

(6) Building is more economical since the height of the structure is decreased, resulting in more seats per cubic foot.

(7) Design and construction of side walls are simplified.

(8) Proscenium is eliminated. The large screen affects the scale and interior treatment of the theater whereas the small screen is a separate part of the theater. The large screen becomes an integral part that determines the scale of the treatment.

(9) Auditorium width is restricted within the range of good horizontal sight lines.

Planning of Aisles

Two methods of facilitating audience circulation are possible:

(1) Increasing the number of aisles. The Los Angeles Theater, designed by S. Charles Lee, architect, has as few as six seats between aisles.

(2) Increasing space between rows to allow passage without disturbing seated patrons. This scheme, known as the "Continental Seating Plan," is not allowed by many building ordinances in this country. The Goodman Memorial Theater in Chicago, designed by Howard Van Doren Shaw, architect, illustrates this aisle scheme with rows 42" back to back; a U-shaped corridor around the auditorium makes circulation easy.

Seats

Since the attendance of the theater audience varies according to the time of performance it is necessary that, in order to stabilize the auditorium acoustics, the seat and back should be constructed of materials with acoustic values comparable to those obtained when the seat is occupied by a spectator.

It has been found desirable to equip seats with "program lights." This device, used for the first time in the Earl Carroll theater, consists of a shielded bulb, push button, and a flashlight battery

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An all-oil product, the new Barreled Sunlight Flat Wall Finish may be tinted any harmonious shade with pure colors-in-oil. Comes in cans, five-gallon buckets and large drums. Quantities of 5 gallons or over tinted to order at the factory without extra charge.

PAINTING SPEED. It's vital to the cost of every paint job in the buildings you plan. It determines the amount of your greatest painting expense . . . time and labor.

How can you increase painting speed . . . decrease painting costs . . . without sacrificing the quality of the job? In the amazing "slip" of the new Barreled Sunlight Flat Wall Finish you'll find the answer.

Painters can't help working faster . . . doing a better job . . . with this sensational new flat wall finish. No other high-quality flat compares with it for ease of flow. It slips right off the brush . . . effortlessly . . . without the slightest pull or drag.

By its remarkable "slip," the new Barreled Sunlight Flat Wall Finish adds speed and skill to any painter's brush. It means more rooms painted . . . painted better . . . every single day they work.

Tremendous "yardage," too, brings further economies to every job. Repeated, impartial tests prove Barreled Sunlight Flat Wall Finish has *a spreading power from* 16% *to* 50% *greater than that of any other high-quality flat finish.* From 16% to 50% less paint required!

When dry, Barreled Sunlight Flat Wall Finish is distinctly handsome, flawlessly smooth, without brush marks or laps. Close inspection shows a faint sheen . . . the sign of a surface that's dirt- and dust-resistant, easy to wash!

Send for further details and a sample can of this handsome, economical new flat wall finish. Write to U. S. Gutta Percha Paint Co., 22-F Dudley St., Providence, R. I. Branches or distributors in all principal cities. (For Pacific Coast, W. P. Fuller & Co.)

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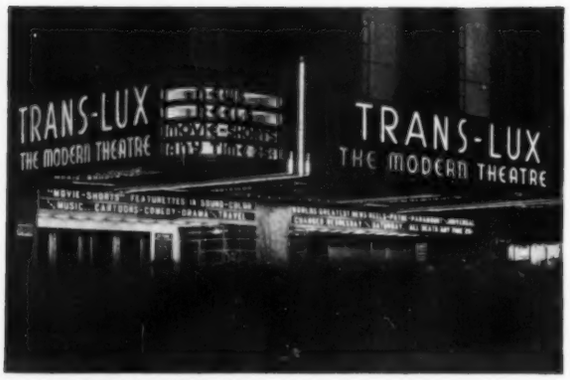


Gray — BETTER THEATRES

Acme — P & A — BETTER THEATRES

Entrance and interior of twin TRANS-LUX THEATERS on Broadway, New York City. L. E. Dinslow and Thomas W. Lamb, Associated Architects.

set in one unit at the back of each seat; in addition to giving light for reading programs it is useful in locating dropped articles.

Many theaters are now being equipped in part with headphones as aids to the deaf. Some devices now on the market are made with adjustable volume and others have constant volume for those only slightly deaf. These devices generally consist of a headphone with a small potentiometer, which can be obtained at the box office and then plugged into a seat receptacle.

SOUND TREATMENT

Theaters presenting sound pictures require careful acoustic treatment of the auditorium. The volume of sound from the loud speakers is a limiting factor in the maximum size of such theaters: the volume of sound sufficient to reach distant seats is generally too great for seats near the screen.

At present the sound horns are placed directly behind porous or perforated screens. The perforations have been found objectionable in that they create a "half-tone" effect of the screen image. For this reason efforts were initiated recently by the Society of Motion Picture Engineers to find horn locations which would not necessitate screen perforations, which would give the effect of sound coming from the screen image.

LIGHTING

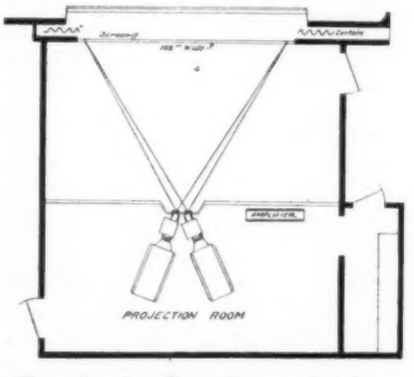
The intensity of illumination should diminish gradually from the street to the auditorium so that the eyes of the patrons may become accustomed gradually to the lower intensities. Except in the case of Trans-Lux theaters, auditorium lighting should be low in intensity, sufficient only to enable patrons to find seats but not strong enough to make movements of other patrons distracting. There should be less light at the front near the screen. All light sources should be diffused. No lights should be near the sight lines to the screen, nor should light fall on the screen itself.

Severance Hall in Cleveland (Walker and Weeks, architects), and Earl Carroll theater in New York (George Keister, architect, Jos. J. Babolnay, designer), have color-control consoles so placed that the operator may watch the color lighting effects from the front of the house.

TRANS-LUX THEATERS

Projection on the back of screens is not new. For two decades in Great Britain and on the Continent ground glass or curtains have been used for screens with rear projection. This process has the disadvantage that the wide-angle lens used to cut down the customary distance between the projector and the screen has in the past resulted in a "hot-spot" of light in the center of the image. The film also had to be reversed for titles, and with the advent of sound pictures the rebuilding of sound units was necessitated.

Trans-Lux projection has been developed from a daylight screen used in stock exchanges and brokerage offices. Projectors are directly behind the screen at a distance of 8 ft. The reversal of film is accomplished in the lens system. The screen may be as near as 13'5" to the rear wall of the stage, yet leave ample room for operating the projector. Loud speakers are below and very close to the bottom of the screen.



Plan showing Trans-Lux projection.

According to William Mayer, chief projectionist of the Trans-Lux Movies Corporation, the theater construction is more compact and less expensive. There is also a decrease in panic and fire hazards since the Trans-Lux auditorium may be more highly illuminated than is possible with other methods of projection. This also beneficially decreases contrast between screen and surroundings.

How many miles in the nurses' daily marathon?

Thanks to the courtesy of Grasslands Hospital, Valhalla, N. Y., we are able to give you the actual mileage. Fifteen different nurses at this hospital put on pedometers. The photograph above shows three nurses checking in at the end of the day.

Slightly over eight miles per day was the average of the fifteen tests. But several nurses did far longer distances. Miss S. walked twelve miles. Miss P. and Miss F. did thirteen. That's a real hike!

Hard, uncomfortable floors make those thirteen miles seem like thirty. Nurses who do their walking on hard wood or concrete suffer much more from fatigue than their more fortunate sisters who work on resilient Sealex Linoleum Floors.

In calling these floors *resilient*, we mean that they have just the right amount of "give." They conserve energy—help to keep the hospital staff more cheerful, alert and efficient to the end of the day.

In addition to underfoot comfort, Sealex Linoleum possesses many merits which will be valued in the hospital. It is sanitary, easy to clean, durable, and (thanks to recent reductions) inexpensive to buy. Write our Hospital Floors Department for further facts and figures —and for full information on our Bonded Floors installation service, in which Sealex materials are backed by Guaranty Bonds.

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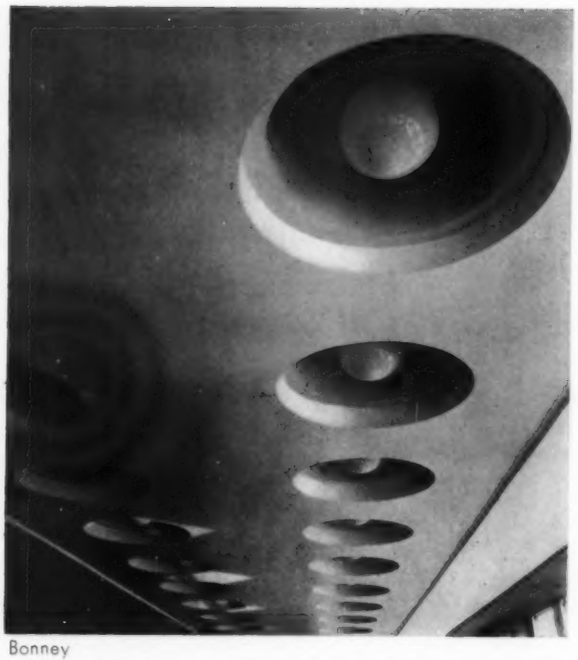


Bonney

Recessed lights in ceiling designed by Rene Prou.

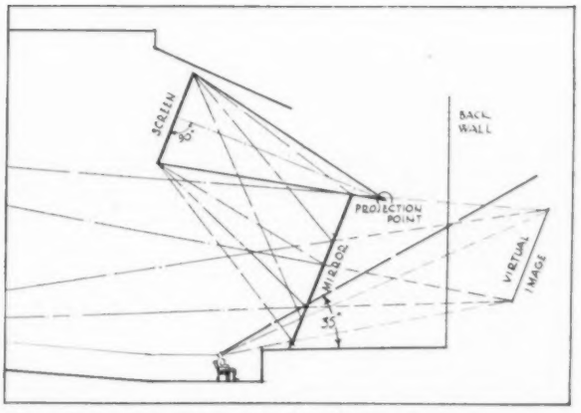
RECENT INNOVATIONS

In addition to seating arrangements and types of projection much equipment has been developed contributing to the operating efficiency of the theater or affording special service to patrons.

In the "Los Angeles" theater a mirror on the promenade wall is arranged prismatically to give a full view of the main lounge on the floor below, thus permitting patrons to meet friends as they arrive. A detector seat panel in the manager's office indicates the seats which are occupied, thus obviating a personal check of the house by ushers. A glass-inclosed soundproofed "mothers' room" on the mezzanine floor has a full view of the stage and is equipped with headphones so that children and mothers may see and hear the pictures in full enjoyment without disturbing other patrons in the theater. A "public address" system of amplifiers is used for transmitting and regulating sound in all parts of the building. In the main lounge a miniature screen (operated from the projection room by means of a prism and light tunnel) transmits the main feature for the benefit of patrons waiting to obtain seats.

Extra-income vending or entertainment machines are in increasing demand, according to theater operators. These vending machines dispense candy bars, chewing gum, cigarettes, perfume, soap, paper towels. Drinking fountains operated by the photoelectric cell and automatic photographing machines have been found successful features of this sort.

Similar devices for extra revenue are the self-photographing motion picture machine and the Melograph, which gives voice tests. These machines and devices, like the glass panel in the sidewalk showing air-conditioning apparatus in the basement of the Studio Theater, Los Angeles, have a distinct advertising value.



From THE ARCHITECT AND BUILDING NEWS

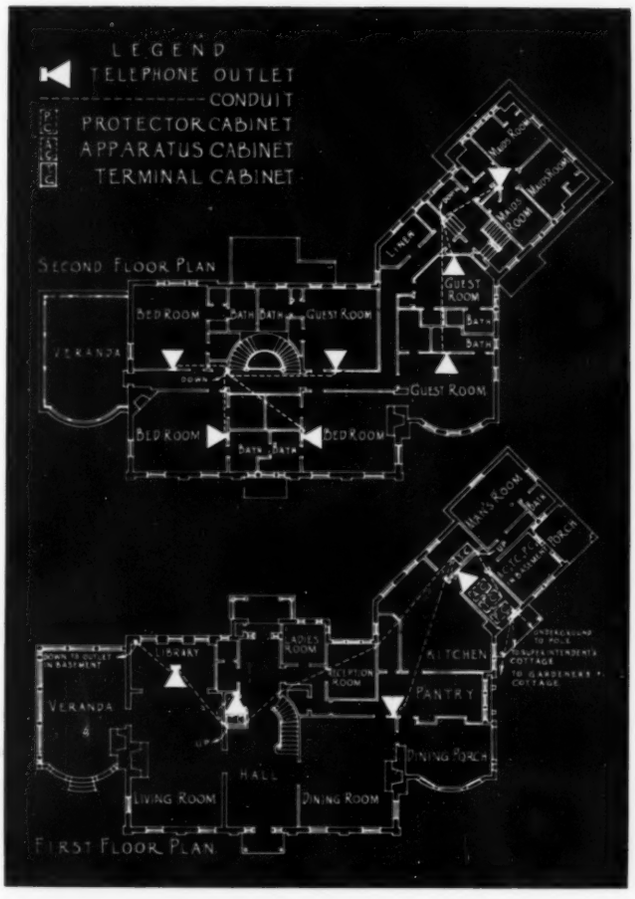
New method of periscopic projection from behind screen with aid of reflecting mirrors.

There are many potential developments of screen projection and presentation. A recent innovation is the method of periscopic projection invented by Dr. R. T. A. Innes, late astronomer to the Union of South Africa, and described in the Architect and Building News (March 18, 1932). In this system (see illustration) the projector is behind the curtain line, concealed from the audience and directed toward a screen placed high up in the auditorium outside the proscenium opening, which is now no longer necessary. The audience sees the image on the screen in a mirror placed in the usual location of a motion picture screen, but tilted to catch the proper reflection. The idea of periscopic projection is to lengthen the "throw" and correct distortion due to excessive projection angles. Stereoscopic effects are claimed because of the reflections from the two surfaces of the glass.

Courtesy BETTER THEATRES

Sidewalk window, showing air conditioning equipment. Studio Theater, Los Angeles.

• • • YOUR CLIENTS CAN CALL ACROSS THE HALL, OR ACROSS THE COUNTRY, OVER REGULAR BELL TELEPHONES



IN PLANNING larger homes and estates, it is often important to provide for communication between rooms and between buildings, as well as to the outside world. Then boudoir can talk to kitchen or library to garage, easily, quickly. Time and steps are saved for all the household.

Such convenience can be readily arranged by consulting the local telephone company. They'll help you choose the Bell inter-communicating system best adapted to your project. They'll show you how conduit can be built into walls and floors to carry and conceal all wiring . . . to provide telephone outlets wherever they're wanted . . . and to protect against most types of service interruptions. There is no charge for this advisory service. Just call the Business Office and ask for "Architects' and Builders' Service."

The residence of Mr. Frederick Wing Rockwell, Norfolk, Connecticut, is equipped for complete telephone convenience with two central office lines, a dial inter-communicating system, and twelve telephone outlets. There are additional outlets in the superintendent's and gardener's cottages. TAYLOR AND LEVI, Architects, *New York City*. OTTO E. GOLDSCHMIDT, Consulting Engineer, *New York City*. *For full efficiency, such arrangements should be carefully planned in advance.*

WAGE SCALES IN THE BUILDING TRADES

Information Furnished by National Association of Builders Exchanges and Compiled by Division of Statistics and Research, F. W. Dodge Corporation, as of May 15, 1932

	Asbestos Workers	Bricklayers	Bricklayers' Tenders	Carpenters	Cement Finishers	Electricians	Hoisting Engineers	Iron Workers—Ornamental	Iron Workers—Structural	Laborers	Lathers	Painters	Plasterers	Plasterers' Tenders	Plumbers	Roofers—Composition	Roofers—Slate & Tile	Sheet Metal Workers	Steamfitters	Stone Masons	Tile Setters	Tile Setters' Helpers
Akron	$1.37½	$1.45	$0.45	$0.95	$0.90	$0.90	$0.70	$1.00	$1.15	$0.45	*$1.37½	$0.90	*$1.62½	$0.80	$1.00	$0.95	$0.95	$0.95	$1.00	*$1.45	*$1.25	*$0.50
Atlanta	1.00	1.25 1.40	‡.30 .45	.70	1.25	.90 1.10	.60 1.00	.35 1.85	1.25	.25 .35	1.00 1.25	.75	1.25	.30 .45	1.25	.80	.80	.90 1.00	1.25	1.00 1.25	1.25	.40
Baltimore	1.12½	*1.25	1.00	*1.00	*1.25	*1.43¾	*1.25	*1.65	*1.65	.35 .40	*1.50	*.90	*1.25	1.00	*1.00	1.00	1.00	*1.37½	*1.25	1.25	1.25	.72
Boston	*1.50	*1.30	*.70	*1.17½	1.17½	*1.50	1.17½	1.17½	1.17½	.70	*1.50	*1.17½	*1.62½	*.95	*1.25	*1.37½	*1.37½	1.17½	*1.25	*1.30	*1.50	*.95
Buffalo	1.50	*1.25	.50 .60	*1.00	1.12½	*1.30	$49.50 to $55.00 wk.	.85	*1.37½	.50 .60	1.37½	*1.00	1.62½		1.25	.85	1.37½	1.10	*1.50	*1.25	*1.43¾	.70
Chicago	1.30	*1.37½		*1.31¼	1.31¼	1.25 1.50	1.31¼	1.31¼	1.35	.82½	*1.37½	*1.41	*1.37½	.88¾	1.37½	1.37½	1.40	1.37½	1.37¼	1.37½	1.37½	.90
Cincinnati*	1.15	1.37½	.70	1.20	1.02½	1.25	1.07½	1.25	1.25	.45	1.31¼	1.10	1.37½	.70	1.25	.92½	1.07½	1.07½	1.25	1.37½	1.25	.75
Cleveland*	1.17½	1.37½	.72	1.12½	1.12½	1.05 1.25	1.12½	1.25	1.25	.72	1.37½	1.12½	1.37½	.72	1.25	1.15	1.37½	1.12½	1.25	1.37½	1.25	.81¼
Columbus	1.25	1.30	.90	1.00	.85 1.25	1.00	.60 1.25	1.25	1.25	.50	1.37½	1.00	1.00	.40 .50	1.00	.70 .80	.80 1.00	1.00	1.00	1.30	1.37½	.45
Dallas††	10.50	8.00 10.00	.40 .50	6.00 8.00	8.00 10.00	8.00 *11.00	9.00 10.00	8.00 10.00	8.00 10.00	.30 .40	8.00 10.00	6.00 *9.00	8.00 *10.00	.40 *.50	12.00	8.00	9.00	8.00 *10.00	12.00	8.00 10.00	*12.00	.55 †*.75
Dayton*	1.25	1.30	.80	1.00	1.15	1.55	1.25	1.35	1.35	.35	1.10	1.00	1.25	.80	1.15½	.85	1.00	1.00	1.15½	1.30	1.50	.60
Denver††	9.00	12.00 *13.00	6.50 7.00	10.00	10.00 11.00	10.00 11.00	10.00	10.00 11.00	10.00 11.00	4.00 5.00	11.00	*10.00	12.00	7.00	11.00	7.00 8.00	7.00 8.00	9.00	9.50	12.00 13.00	10.50	†.62½
Des Moines	1.00	1.25	.65	1.00	1.00	1.00	1.00	1.00	1.00	.55	1.00	1.00	1.25	.75	1.25	1.12½	1.12½	1.12½	1.25	1.50	1.25	.67½
Detroit	1.37½	1.25 max.	.55 .60	.80 1.00	.70 .90	1.25 1.55	.60 1.00	1.00 1.20	1.00 1.25	.50 .55	1.37½	.80 1.00	1.00 1.25	.70 .80	1.00 1.50	.70 .90	.80 1.00	.80 1.00	1.25 1.50	1.25 1.50	1.00 1.25	.80
Duluth	1.00	1.10	.35 .45	.75 .85	.75 .85	.90	.80	.80	.90	.35 .45	.85	.80	1.10	.70	.95	.70	.70	.80	.95	.75 1.10	1.25	.80
Erie	.80 .90	1.31¼	.50 .60	1.00	1.00	1.00 *1.25	1.12½	.60 .90	1.10 1.12½	.35	1.12½	.75 .90	1.31¼	.50 .60	1.18¾	.60 .70	.60 .70	1.00	*1.18¾	1.31¼	1.00	.50
Grand Rapids	.65 .80	1.25	.40	.65	.65	.90	.75	.80	1.00	.40	.80	.60	.80	.40	.90	.50	.70	.70	.90	1.25	1.25	.50
Houston	NO FIGURES AVAILABLE																					
Indianapolis	1.32½	1.62½	.90	1.22½	1.17½	1.50	1.37½	1.45	1.45	.40 .45	1.37½	1.25	1.57½	1.00	1.00	.60 .90	1.27½	1.22½	1.50	1.62½	1.50	.60
Kansas City	1.05	1.32½	.80	1.12½	1.12½	1.50	1.12½	1.12½	1.12½	.70	1.25	1.12½	1.32½	.80	1.25	.92½	.92½	1.37½	1.25	1.12½	1.25	.75
Los Angeles††	10.00	8.00	6.00	7.00	8.00	8.00	8.00	7.00	7.00	4.00	8.00	7.00	9.00	7.00	9.00	7.00	7.00	7.00	9.00	11.00	10.00	†.75
Louisville	1.12½	1.25	.65	.80	1.00	1.00	1.00	1.25	1.25	.50	1.37½	.90	1.62½	.65	1.12½	.30 .50	.85	.85	1.12½	1.25	1.25	.50
Memphis	1.00	1.37½	.50	.50 .87½	.50 .75	1.00		.75	.75	.20	1.00	.75	1.25	.50	1.25	1.00	1.25	1.12½	*1.25	1.37½	1.25	
Milwaukee	1.15	1.00	.90	1.10	1.00	1.25		1.05	1.05	.50 .75	1.31¼	1.00	1.00	.90	1.00	1.00	1.00	.92½	.93¾	1.00	1.37½	.75
Minneapolis	1.06¼	1.10	.55 .65	.75 .85	.75 .85	.90	.80	.90	.90	.45	.75 .85	.80	1.10	.70	.95	.70	.70	.80	.95	1.10	1.25	.65
Nashville	1.00	1.00		.65		.75 .87½					1.00	.80	1.00	.30		.65	.65	.65	1.25	.90	.65	
New Haven*	.70 .90	1.40	.50 .60	.90 1.06¼	1.40	.85 1.00	1.16¾ 1.27½	1.37½	1.37½	.50 .65	1.27½	.80 1.00	1.40	.50 .65	1.06¼	.65	1.50	1.06¼	1.06¼	1.40	1.40	.87½
New Orleans	.65 .80	1.25	.85	.55 .75	1.00	1.25	1.25	1.25	1.25	.35 .50	1.25	.75 .90	1.25	.75	1.00 1.25	.40	.90 1.15	.90	1.05 1.25	1.50	1.25	.35
New York City††	10.00	12.00	7.00	10.00	10.00	10.00	12.00				10.00	10.00	10.00	7.00	10.00	9.00	11.00	10.00	10.00		10.00	7.00
Oakland††	8.00	11.00	7.00	9.00	9.00	9.00	9.00	9.00	11.00	5.50	10.00	9.00	11.00	7.50	10.00	8.00	8.00	9.00	10.00	8.50 9.00	10.00	†.75
Oklahoma City††	8.00	8.00	4.00	6.00 8.00	8.00	6.00 8.00	8.00	8.00	8.00	3.50	.80	7.00 8.00	.80	4.00	.80	6.00	6.00	8.00	8.00		11.00	†.62½
Omaha	1.32	1.25	.65 .75	1.00	1.25	1.25	1.12½	1.12½	1.12½	.50	1.12½	.90 1.00	1.25 1.37½	.70	1.12½	1.00	1.00	.90	1.12½	1.12½	1.25	.60
Philadelphia	1.12½	1.50	.70	1.25	.80 1.05	1.00 1.50	$40.00 to $50.00 wk.	1.25 1.62½	1.00 1.15	.30 .45	1.37½ 1.62½	.80	*1.62½	1.12½	1.04	.80 1.00	1.00	1.30	1.04	.50 1.00	1.25	
pittsburgh	*1.70	*1.50		*1.25	*1.40	*1.56¼	1.37½ 1.43¾	*1.37½	1.37½	*†.80	*1.66¼	*1.27½	*1.66¼		*1.71⅞	*1.50	*1.57½	*1.31¼	*1.71⅞	*1.62½	1.33¾	.88
Portland, Ore.††	8.00	*12.00	7.20	7.20	*7.20	*8.00	7.20	8.80	8.80	4.80	*8.80	7.04	*9.60	4.80 *7.20	*8.80	7.20	7.20	*8.00	*8.80	*10.00	10.00	
Reading	.70 .80	.90	.75	.75	.85	.75				.35	.75	.70	.85	.75	.90		.80	.80	.90	.75	.90	.50
Richmond	.60 .65	1.50	.55	.80	.75	.75 .87½	.75 .90	.90 1.00	.87½ 1.12½	.40	.75	1.70	1.25 1.50	.50 .60	.87½	.80	.80	.87½	.87½	1.25	1.12½	
Rochester	1.26½	1.25		*1.00	*1.12½	*1.15½	1.00	*1.00	*1.00	.55	1.00	*1.00	*1.25		*1.17½	*.90	*.90	*1.00	*1.17½	*1.25	*1.25	
Salt Lake††	6.00 7.20	9.00	6.00 8.00	7.20	8.00	8.00	9.00	8.00	8.00	4.00	10.00	7.20	10.00	8.00	9.00	7.20	7.20	8.00	9.00	9.00	9.00	†.50
San Antonio††	4.50 9.00	6.00 12.00	2.50 3.00	5.00 7.00	3.00 6.00	6.00 9.00	3.00 5.00	4.00 5.00	4.00 8.00	2.00 2.75	8.00 12.00	4.00 7.00	6.00 8.00	2.25 3.00	6.00 8.00	4.00 6.00	6.00 8.00	6.00 10.00	8.00	6.00 12.00	8.00 12.00	
San Francisco	8.00	11.00	7.00	9.00	9.00	9.00	9.00		11.00	5.50	8.50 10.00	9.00	11.00	7.50	10.00	8.00	8.00	9.00	10.00		10.00	
Seattle††	8.00	9.60	5.28	7.20	7.20	*8.80	8.00	8.00	8.80	4.75	*8.80	*7.20	*9.60	*6.40	*8.80	7.20		8.00	*8.80	9.60	8.00	
Sioux City	.90	1.50	.40 .60	1.12½	.90 1.00	1.00	.75 1.00	.75 1.00	.75 1.00	.40 .50	1.00	1.00	1.25	.60 .70	1.12½ 1.50	.85	.85	1.00	1.00 1.25	1.50	1.50	.40
St. Louis	1.25		1.00	1.25	1.31¼	1.67½		1.47	1.47		1.25	1.25		1.06¼		1.17½	1.25	1.25		1.25	1.25	
St. Paul	1.18	1.10		.75 .85	.75 .85	.90	.80	.90	.90	.45	.75 .85	.80	1.10	.70	.95	.70	.70	.80	.95	1.10	1.25	
Washington, D.C.	*1.50	1.75	.50 .75	*1.37½	1.25	*1.65	*1.37½	*1.65	*1.65	.75	*1.62½	*1.37	*1.75	*.75	*1.50	*1.37½	*1.37½	*1.50	*1.50	*1.25	*1.50	.75
Wichita	.60	.75 1.25	.25 .40	.40 .75	.40 1.00	.50 .87½	.30 .75	.40 1.00	.40 1.00	.20 .40	.50 1.25	.50 .87½	.60 1.25	.25 .50	1.00	.50 1.00	.50 1.00	.50 1.00	.75 1.12½	.75 1.25	.50 1.00	.25 .40
Youngstown††	*1.37½	12.00	6.80	10.00	9.00	11.00	10.00	12.00	12.00		12.00	10.00	12.00	6.80	11.00	10.20		10.00			10.00	.70

NOTE.—Where two figures are shown they are the minimum and maximum. All figures are for hour rates except as indicated. ††8-hour day. †Rate per hour. *On 5-day week basis. Asterisk after city indicates all trades on five-day week basis.

ABOVE DATA ARE WAGE SCALES AND DO NOT NECESSARILY INDICATE ACTUAL WAGE RATES BEING PAID IN THE RESPECTIVE TRADES.

A NEW TEMPLE OF HEALING INVITES THE SUN

LOS ANGELES COUNTY
GENERAL HOSPITAL

Architect: Allied Architects, *Cons. Engr.:* E. L. Ellingwood, *Gen. Con.:* Weymouth C. Crowell, *Plumb. and Heat. Con.:* Howe Brothers. All of Los Angeles, California

ON a hill remote from the din and stress of the city, bathed by the sun and soft airs of a favored region, admirable for design, great in size and facilities, complete in every modern resource, the Los Angeles County General Hospital takes high rank among the marvelous institutions of its kind built in this country in recent years. Their like never was before in the world. For never had science and the arts reached a development to make them possible.

Only the best in design, construction and equipment could be thought fit to go into such a building for any use.

It is a matter of pride for the manufacturers of NATIONAL Pipe that in the Los Angeles County General Hospital, as in other noteworthy hospitals lately completed, the major tonnage of pipe was NATIONAL—

America's Standard Wrought Pipe

NATIONAL TUBE COMPANY, PITTSBURGH, PA.
Subsidiary of United States Steel Corporation

NATIONAL PIPE

Terrazzo floor in the Medical Arts Bldg., Pittsburgh. M. Nirdlinger, architect; Patrizio Art Mosaic Co., terrazzo contractor, both of Pittsburgh. Atlas White portland cement used.

EXACTLY what you desire in color and design—that is one of the satisfactory dividends obtained from an investment in an Atlas White terrazzo floor.

With this modern flooring material, you may create your own patterns and color schemes. Terrazzo designs are limited only by convention and the imagination. To carry out the designs created, you may select from a wide variety of marble chips of many colors and shades; you may select from a number of color pigments for matrix tints; you may create innumerable effects by variation and combination. Whatever the design, whatever the colors, they will be faithfully interpreted with Atlas White portland cement.

Further information on terrazzo made with Atlas White portland cement will be furnished by terrazzo contractors or by

UNIVERSAL ATLAS CEMENT CO.

208 South La Salle Street, Chicago

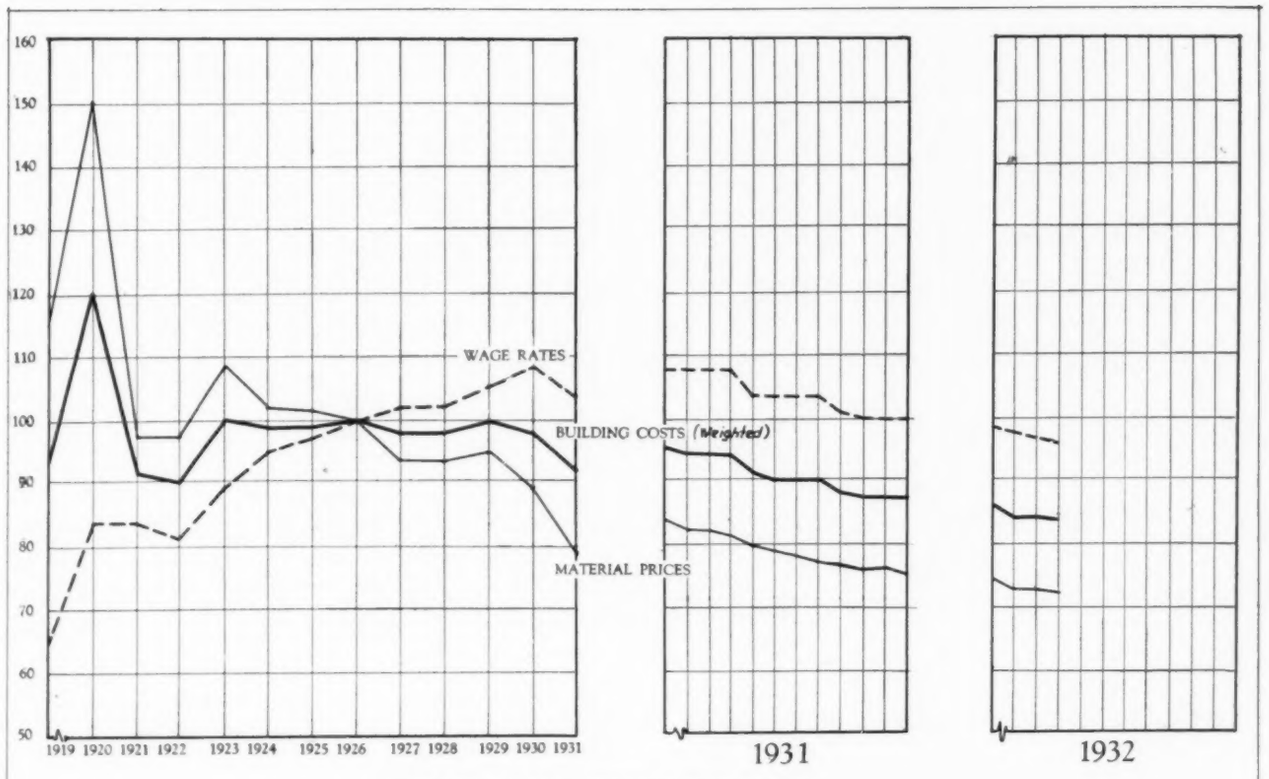
Subsidiary of United States Steel Corporation

ATLAS WHITE PORTLAND CEMENT

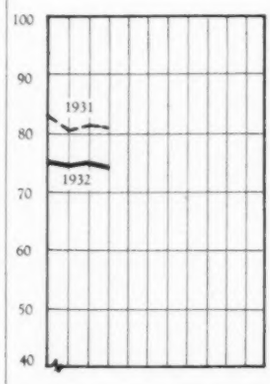
PLAIN AND WATERPROOFED

MATERIAL PRICES, BUILDING WAGE RATES AND BUILDING COSTS COMPARED

1926 Monthly Average — 100

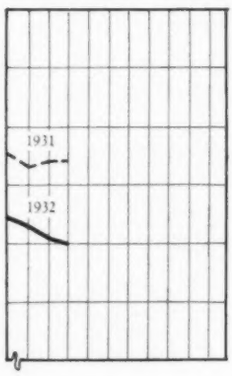


WHOLESALE PRICE INDEXES



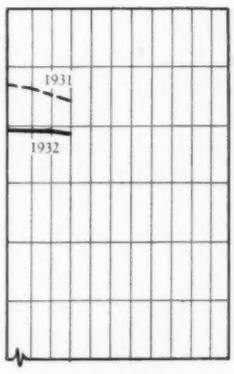
PAINT MATERIALS

Further price weakness in paints, varnishes and oils appears likely.



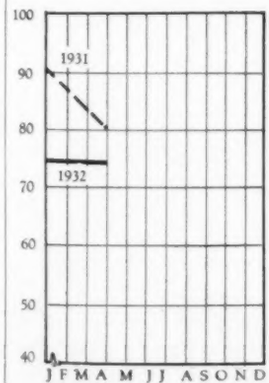
LUMBER

Weakness in lumber prices still persists; there is little likelihood of a nearby change in trend.



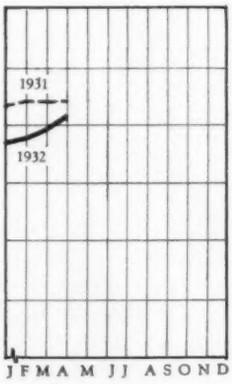
BRICK AND TILE

Present level of brick prices will be severely tested in nearby months.



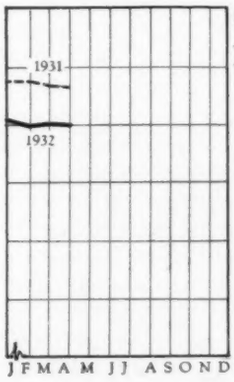
CEMENT

Present stability in cement prices is probably more apparent than real.



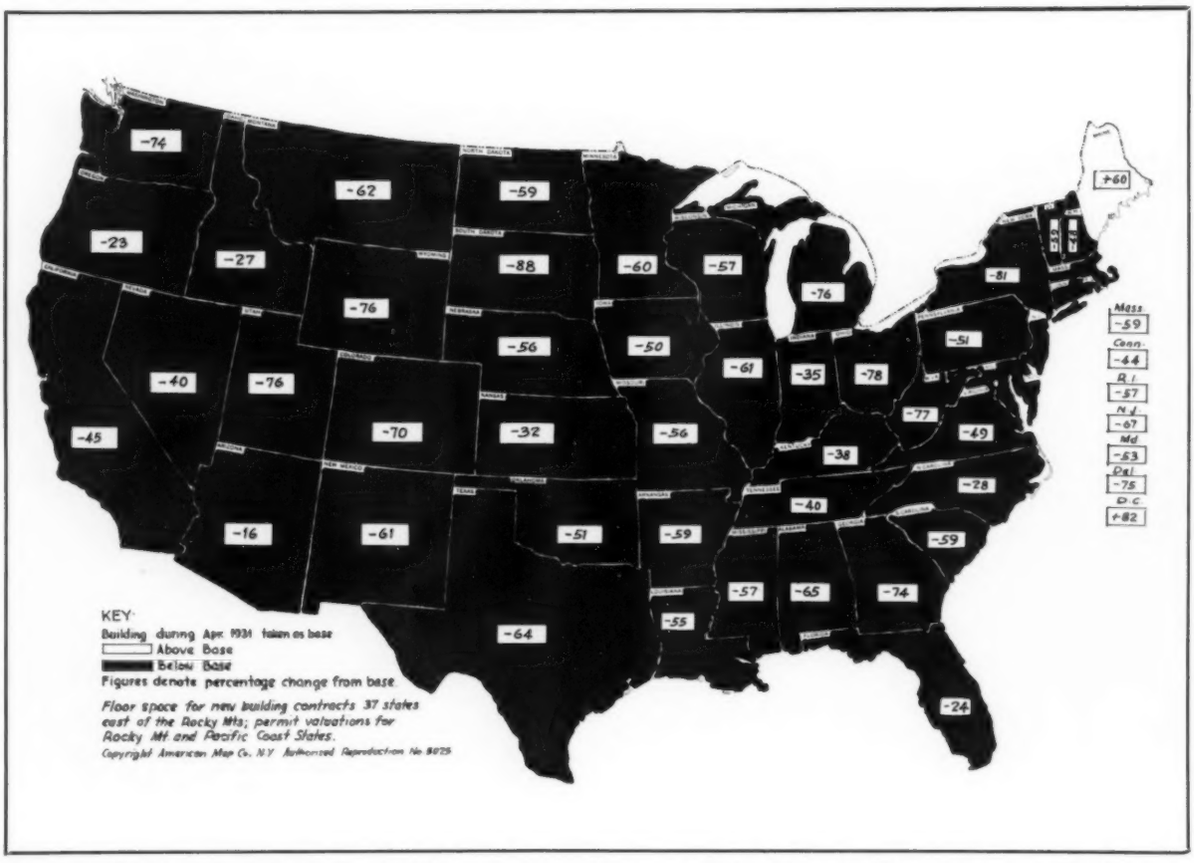
STEEL

In the light of present low construction volume it is hard to see how present trend of structural steel can be maintained.



OTHER MATERIALS

The trend here still seems to be downward.



The April building map showed only Maine and the District of Columbia, of all the states east of the Rocky Mountains, where floor space totals of new building contracts were higher than in April, 1931. In March the map showed five states where awards were higher than in the corresponding month of last year, while the February map showed seven states on a higher basis than a year earlier.

BUILDING TRENDS INDICATED BY THE CENSUS*

PART 8—THE OUTLOOK FOR RECREATIONAL BUILDINGS

By L. SETH SCHNITMAN

Society has always provided itself with the instruments for mental and physical relaxation. Man's progress has been marked by his theaters, parks and park buildings, clubs and lodges, and auditoriums and halls. It is a far cry from the discus thrower of ancient Greece to the "talkies" of modern civilization. But each form of relaxation has left its impress upon the architecture of our recreational facilities. Theater architecture as expressed with all of its trappings and embellishments since the War will serve for years to come, to symbolize the speculative era which culminated so disastrously. If American industry has learned anything from the current depression, architecture, as it relates to our recreational requirements, will in the future likely rest upon a broader utilitarian conception than during the decade which closed in 1930.

During the ten years from 1921 through 1930 approximately $1,875,000,000 went into the erection and extension of social and recreational facilities throughout the United States. During the same period total construction of all descriptions approximated $71,800,000,000. Thus, about $2.70 was expended on new recreational facilities for each $100.00 of all other classes of construction. A comparison with residential building is perhaps of broader significance; on this basis approximately $385.00 was expended on new recreational facilities for each of the 4,900,000 housing units that were erected during the decade. The total value of new school and college buildings during the same decade approximated $3,750,000,000; the erection of new church buildings amounted to about $1,100,000,000; and the erection of hospitals and institutions showed a total approximating $1,400,000,000. Combined, these four major classifications ministering to the purely social needs of our people, exclusive of

(Continued on page 48)

* Earlier articles in this series of population studies have appeared in these issues: Parts 1 and 2—August, 1931; Part 3—September, 1931; Part 4—October, 1931; Part 5—November, 1931; Part 6—February, 1932; Part 7—April, 1932.

Age exempt buildings ..*why not?*

WHAT are the tell-tale signs of age in a building except Dirt and Dust ground into floors, rubbed into walls or lodged permanently on decorations which have to be refinished?

SPENCER CENTRAL CLEANING SYSTEM

Remove the cause and you remove the result. The Spencer Central Cleaning System removes all dirt and dust through concealed pipes to a container in the basement.

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Whether it be a hotel, school, office building, private residence, we can refer you to dozens of successful installations in your vicinity.

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THE SPENCER TURBINE CO.
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NATIONAL THEATRE SUPPLY COMPANY

Offices in All **Principal Cities**

MATERIAL PRICE MEASURING ROD*

The prices in this tabulation enable one to visualize at a glance the main trend of the material market.

Their significance does not extend beyond that point, and the explanation under them should be read carefully.

F. W. Dodge Corporation Composite Prices as Indicated in Explanation—

Material	This Month	Month Ago	Year Ago
Portland Cement.....	$2.00	$2.00	$2.04
Common Brick.....	11.93	11.93	12.74
Structural Steel.....	1.60	1.50	1.65
Lumber	15.85	15.92	19.08

Prices given in this comparison are composite and do not in all cases refer to one item. For instance, the price of structural steel is the composite of prices of shapes and plates f.o.b. Pittsburgh; the price of lumber is a composite of five items of Southern pine and five items of Douglas fir f.o.b. mill; the price of cement is a composite of prices in fourteen different cities per barrel, carload lots, to contractors; price of brick is composite in fourteen cities per M, delivered on the job.

* (as previously published in *General Building Contractor*)

shelter, have shown an expenditure for new buildings during the decade that ended with 1930 approximating $8,125,000,000. To put this in another way, out of each $1,000 that has been expended on these social types $462 went into schools and colleges; $231 into recreational facilities, exclusive of those in connection with schools; $172 into the erection of hospitals and institutions; and $135 into church edifices. On this basis approximately $1,660 was expended for new social structures, as above defined, for each new housing unit that was erected during the decade.

In the 13 cities in the United States which in 1930 had 500,000 or more inhabitants, expenditures for new recreational buildings during the decade approximated $675,000,000. In these same cities expenditures for new schools and colleges over the same period totaled $950,000,000; new church building approximated $275,000,000; and the erection of new hospitals and institutions reached the approximate total of $425,000,000. These four types of social buildings aggregated about $2,325,000,000. Thus out of each $1,000 that was expended for social facilities $409 went into schools and colleges; $290 into recreational buildings; $183 into hospitals and institutions; and $118 into the erection of new churches. In these 13 largest cities approximately $1,200 has been expended for social structures as above combined for each new housing unit that was erected in those cities during the decade. This is in sharp contrast with the $1,660

Room for a candy stand in the space you save

with NOFUZE *Switchboards*

WESTINGHOUSE gives an answer to the age-old building problem, "How can more renting space be obtained without sacrificing beauty or utility?"

Westinghouse Nofuze switchboards, equipped with "De-ion" Circuit Breakers instead of switches and fuses, occupy only one-half to two-thirds the space of conventional switchboards.

There's room for a candy stand—a shoe shine parlor—a soft drink fountain—or a small florist shop in the space thus saved; increasing the building revenue and adding a convenience for tenants.

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(for homes)
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ratio for the country at large.

From this contrast it is not safe to conclude that in our largest cities construction of facilities to meet our social needs has lagged; it is rather that residential building in the metropolitan centers anticipated too large a concentration of population in the Metropolitan centers. The growth-rate for urban centers as a whole between 1920 and 1930 was 26.9 per cent while for the 13 cities combined the population growth during the decade was only 23.8 per cent. At the same time residential building in the 13 cities during the ten-year period represented about 40 per cent of all residential building in the United States though these cities accounted for only 17 per cent of the entire population of the country.

It is not singular that recreational facilities and hospitals and institutions for the 13 cities should have shown higher ratios during the decade than was shown for the country at large for these types of social facilities. Nor is it singular that these centers should have shown smaller ratios for schools and colleges and churches than were indicated for the entire country. Proportionately we spent more for new hospitals and institutions in our largest cities because it was in these centers where adult population was concentrated. We expended more money relatively on recreational facilities such as theaters, lodges, halls and auditoriums, because these, too, were essentially to meet adult needs. And we spent relatively less on schools and colleges because actually the child factor had become smaller in importance.

Theater construction during the decade throughout the United States exclusive of theaters built in combination with other superstructures, amounted to about $680,000,000. In the 13 largest cities theater construction approximated $165,000,000 during the ten-year period ended 1930 or 24 per cent of the total for the entire country. During this period many combination theater projects were constructed particularly in our largest cities; were it possible to include data on these projects a greater concentration of theaters in our largest cities would be disclosed.

Altogether we can conclude that the erection of theaters and other recreational facilities during the next few years will likely bear a higher relationship to total social building as previously defined than during the past decade. It appears especially true for our cities under 500,000 population, where the ratio of recreational buildings during the last decade to total social edifices was much lower than in our largest centers. Though life expectancy has made considerable advance in recent years the mortality rate in degenerative diseases has increased with our industrial progress. Certainly from a sociological point of view it is far better to erect facilities for physical and mntal relaxation. Designs for recreational buildings of the future will doubtless rest upon a more fundamental appraisal of social needs. Population data concerning the composition, distribution, and characteristics of our people should afford a logical basis for study of the new requirements.

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6. Costly and frequent repairs fail to solve the problem.
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8. Owners become exasperated at the continuous trouble and expense.
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10. Eventually the architect is blamed by the owner.

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CRITICAL BEAM CONNECTIONS

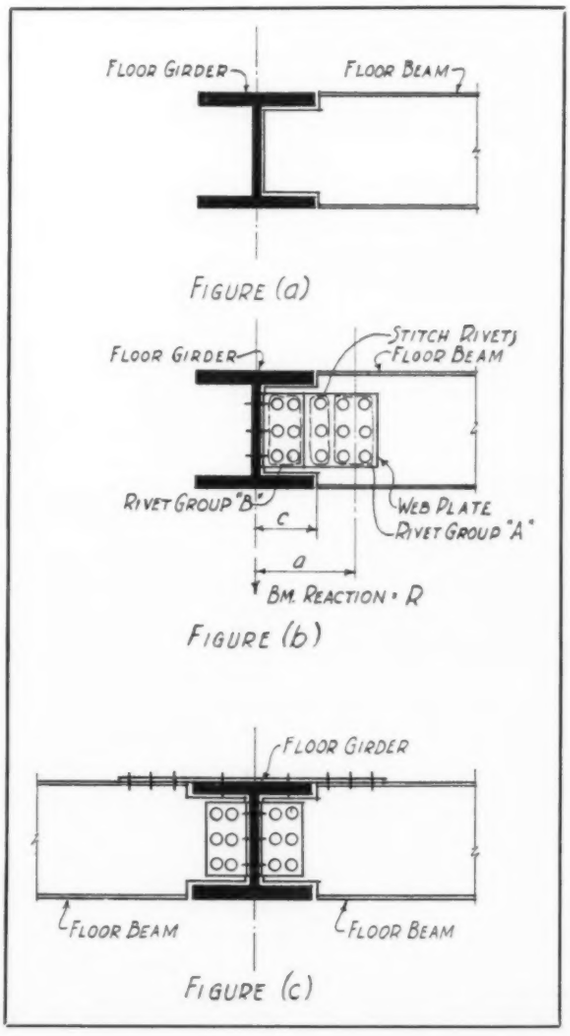
There is a tendency in modern construction, when employing structural-steel framing, to use the newer, heavy wide-flanged girders. This is especially true in recent office buildings, and particularly where headroom is limited or important in cubage values.

Incident to such conditions, there is an important feature which should not be overlooked by architects and structural engineers. When floor beams of depths nearly equal to that of the girder framed into occur, considerable coping or blocking must be done, as illustrated in Figure (a).

The floor beam is weakened at the end, due to the excessive cutting away of the flanges and web, and a critical bending condition in the web may occur at the inner end of the cope.

In order to have the end detail satisfactory as far as stress is concerned, additional plates and rivets may be required.

A few cases of this sort on a large job might not have much influence on the cost of the steel framing, but should this condition be fairly typical it might cause considerable increase in fabrication cost. Unless such typical details are shown originally on the architect's framing drawings, they



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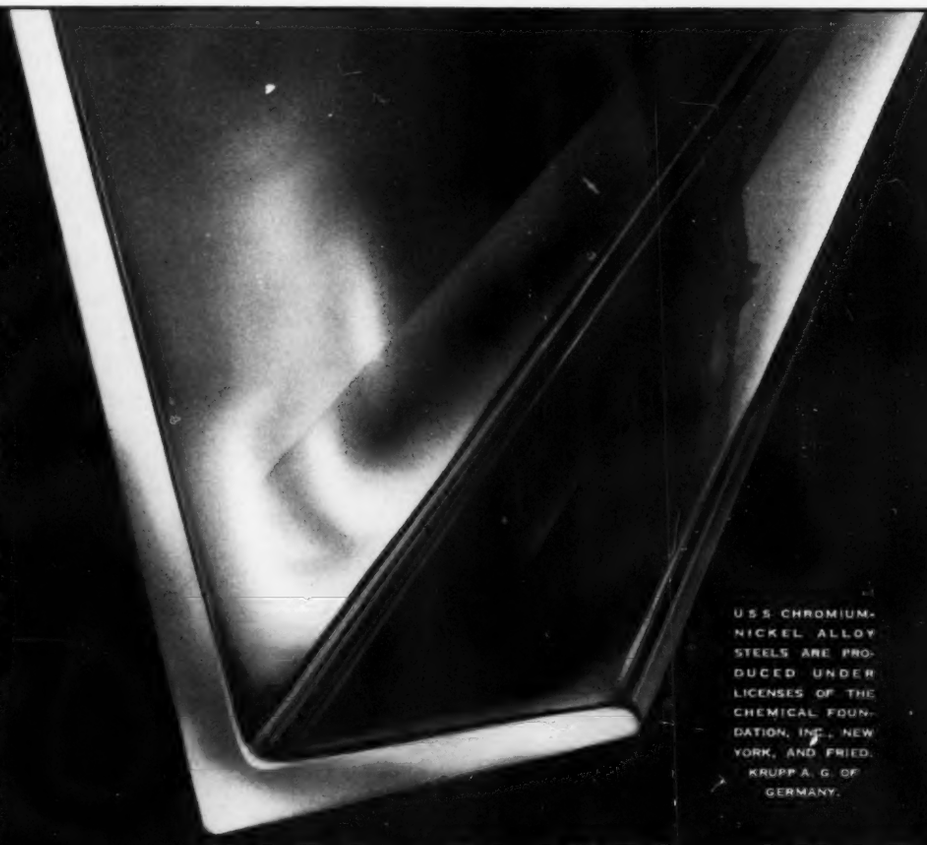

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will not be included in the contractor's original estimate. The steel contractor may submit shop details with common beam connections. When the shop drawings are submitted for approval and are checked with revisions involving extra web plates and rivets requested, the contractor may demand a considerable extra. In Figure (b), the moment at the critical section (the inner end of the cope) is R.c. The moment capacity of the beam at this point is that of the net web only and if this is not as great as the actual moment, the difference must be made up by extra web plates.

The allowable end reaction of the beam without the plates may be found by dividing the moment capacity by the distance "c." The difference between the actual and the allowable reactions multiplied by "a" will give the moment to be applied to the rivet group "A." Rivet group "A" may then be designed by providing for the combining of the shear due to the part of the reaction taken by the plates and the moment in the rivet group.

The shop rivets and the field rivets in the connection angles "B" should of course be sufficient to develop the end reaction, R, at their maximum allowable values.

The rivets between the connections angles "B" and the moment group "A" are stitch rivets. These should be so arranged that the spacing in the direction of the stress is not more than 16 times the thickness of the plates.

The plates should not be too thin for practical reasons; a 5/16" minimum thickness is recommended.

An alternate method for the condition discussed might be made as suggested in Figure (c). If the beams and girder are flush top, a top plate could be used. The tension indirectly induced would be taken out by rivets as indicated. The ends of the beams could be milled to take out any compression. A bottom plate could be employed instead if the beams were flush bottom with the girder.

However, the use of plates interferes with fire protection, clearance with respect to the finished floor or ceiling, and reinforcing rods passing over the connection.

Edward A. Varney
Cleverdon, Varney and Pike,
Structural Engineers, Boston

"HOME FINANCE AND TAXATION"

Volume two of the final reports of the President's Conference on Home Building and Home Ownership—"Home Finance and Taxation"—is now ready for distribution. The first volume of the President's Conference reports entitled "Planning for Residential Districts" appeared in March. Nine more volumes, making a total of eleven. They will appear in the course of the next few months. The volumes can be purchased for $1.15 each postpaid, from Dr. John M. Gries, Executive Secretary, President's Conference on Home Building and Home Ownership, Department of Commerce Building, Washington, D. C.

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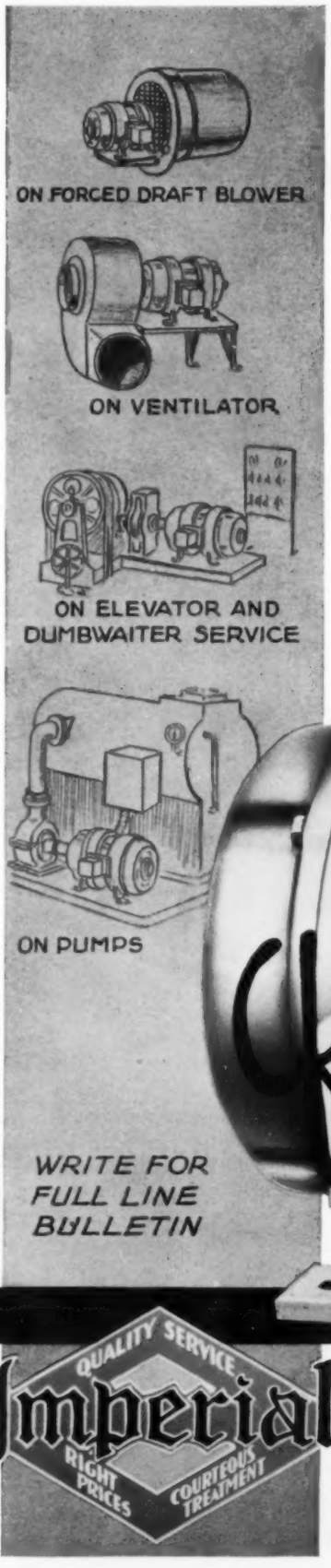

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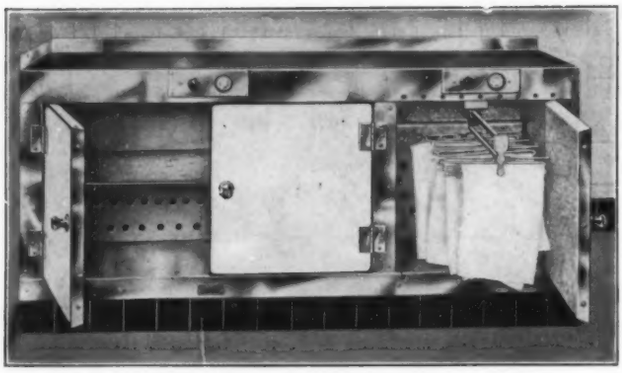

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Prometheus Plate Warmer costs but little to install and is economical to operate. Can't overheat. Shuts off current automatically if accidentally left on.

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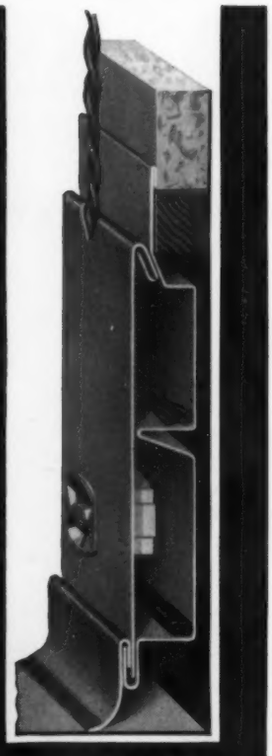

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NAILCRETE BLOCKS

The Nailcrete Corporation, 105 West 40th Street, New York, has endeavored to keep its product "Nailcrete" Nailing Concrete up to the highest standards of quality, reliability and permanency. To determine positively the fire-resisting value, the Nailcrete Blocks were recently submitted to a test at the Underwriters' Laboratories in Chicago and have just been approved by the National Board of Fire Underwriters. "Certificated" Blocks for walls or partitions can now be furnished by Nailcrete Licensees where this type is specified. Other impartial tests have shown that with the asbestos content sound transmission through walls and floors is largely eliminated.

HOPE'S WINDOWS, INC.

The stockholders of Henry Hope & Sons, Inc., New York, and the International Casement Co., Inc., Jamestown, New York, have, on the advice of their directors, decided to merge their interests, and the combined business will henceforth carry on under the new title of Hope's Windows, Inc., with headquarters at Jamestown, N. Y.

FIR PLYWOOD COMPETITION

Appointment of three A. I. A. architects to act as judges in its $1,500 architectural contest is announced this month by Douglas Fir Plywood Manufacturers. Arthur L. Loveless and David J. Myers of Seattle will collaborate with Charles H. Alden, Professional Adviser, in selecting the winning entries.

Entries in the contest, which calls for interior room designs showing practical uses of Douglas Fir Plywood in walls, ceilings and built-ins, and in one-room camp cottage construction, will be accepted until June 15. Winners will be announced in August. Full rules and details of the competition were published in the March issue of THE ARCHITECTURAL RECORD.

NEW FLOOR COATING RESISTS WEAR

A floor coating—recently announced by the Medusa Products Company, a subsidiary of the Medusa Portland Cement Company, 1002 Engineers Building, Cleveland, Ohio—contains a special pigment which is three times harder than steel and insures resistance against normal abrasion and wear on concrete and wood floors.

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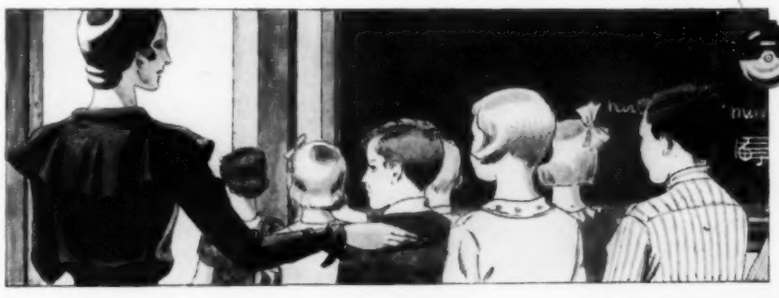

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High School, Jackson, Michigan. Situated in a restricted residential district, this building does not mar the character of the community as would a formal, institutional design.

Modernesque treatment with a Greek vocabulary. Entrance door with gates, Hardware Mutual Insurance Building, Stevens Point, Wis.

The name of Childs & Smith is a synonym for high quality of architectural work and their success is substantiated by the large volume of business which they have enjoyed in the last twenty years. They are best known for their educational, college, bank, and insurance buildings although they have executed a variety of other types. Some of the important projects handled by this firm, including those pictured above and on the next page, are:

High Schools of Jackson and Pontiac, Michigan, La Salle, Illinois, Sheboygan, Fond du Lac, and Wisconsin Rapids, Wis.; many Elementary and Intermediate Schools in Jackson, Pontiac, and Ann Arbor, Mich., Evanston, Wilmette, Oak Park, and Hinsdale in the Chicago area.

They have been connected for many years as Associate Architects on Northwestern University buildings and have executed many college buildings for Lawrence College, Appleton, Wis., Alfred University, Alfred, N. Y., and are acting as Consultant Architects of A. & M. College of Texas.

Representative bank buildings are the State Bank & Trust Co. of Evanston; First National Bank, Davenport, Iowa; First National Bank & Trust Co., Hamilton, Ohio; U. S. National Bank, Kenosha, Wis., to mention but a few.

The Hardware Mutual Insurance Building, Stevens Point, Wis., and the Central Manufacturers Insurance Building, Van Wert, Ohio, indicate the unusual quality of their work in this line.

Of their many churches, the Gary Memorial M. E. Church, Wheaton, Ill., and the First M. E. Church, Kenosha, Wis., deserve mention.

Mr. Childs recently was appointed a member of the National Advisory Council on School Building Problems; Mr. Smith is First Vice-President of the Chicago Chapter, A. I. A., a member of the Architectural Guild of the Diocese of Chicago and of the National Committee on Allied Arts, A. I. A.; Mr. O. H. Breidert, who joined the firm in 1919, was actively connected during the war with the cantonment of the camp of embarkation at Brest.

They have, as a background, excellent training in the best institutions of learning in this country and abroad—Mr. Childs at Armour Institute of Technology and the Art Institute, Chicago; Mr. Smith at the University of Pennsylvania and the Ecole des Beaux-Arts, Paris. Their preliminary training, including that of Mr. Breidert, covers practical experience in the offices of Cass Gilbert, of New York, Holabird & Roche and George Maher of Chicago, and L. B. Dutton of San Francisco.

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THE new corporation will carry on the best traditions of the merged companies. The importation of Hope's casements and hardware from England, the manufacture of Hope's Leadwork and Hope's Bronze Casements at Stratford, Conn., and the manufacture of all International products at Jamestown, N. Y. will be continued and distribution will be made through one sales organization.

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Combining Henry Hope & Sons Inc. and International Casement Co. Inc.

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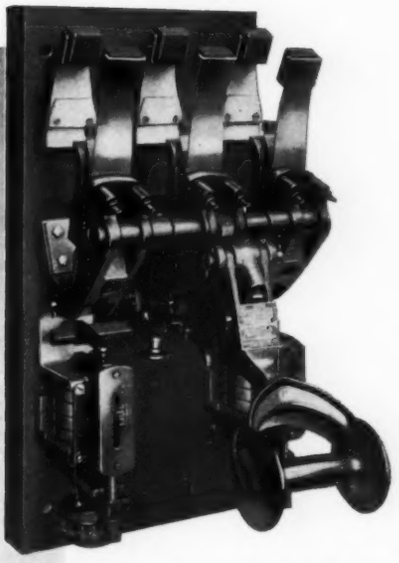

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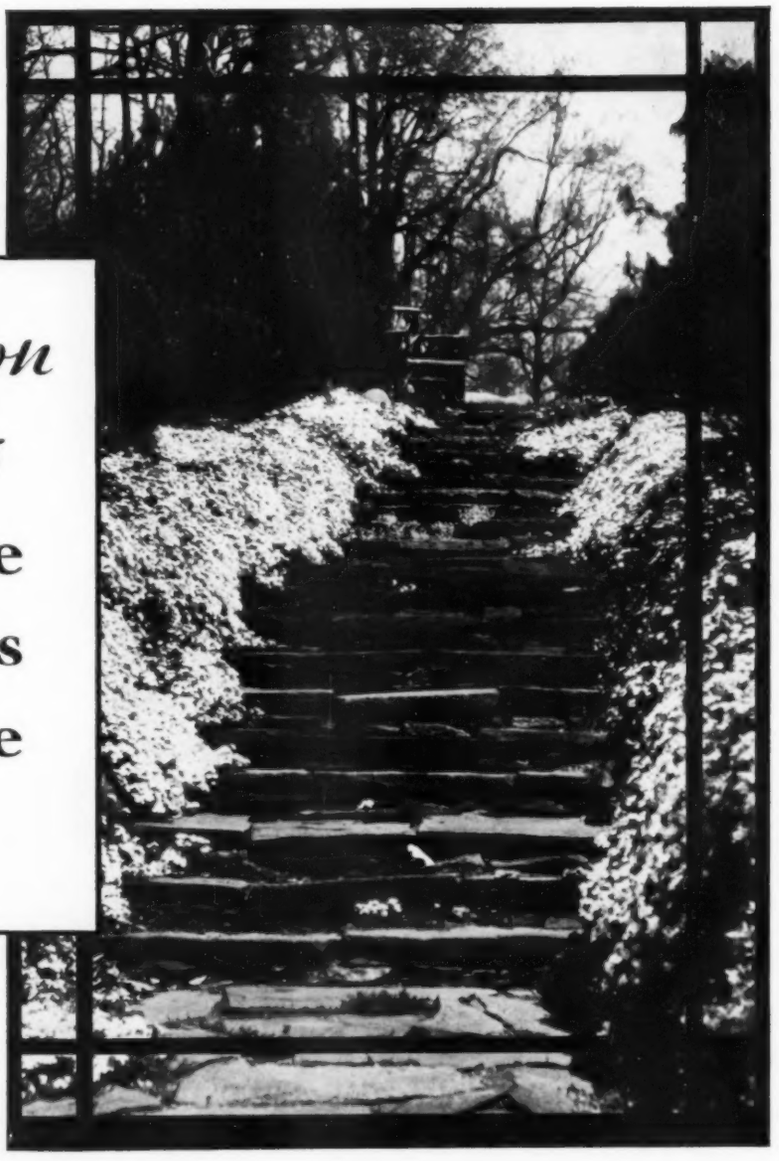

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OLD world charm — Parisian chic — new world luxury — tersely describes the new Parc Vendome apartments, New York City. Its architecture exemplifies the French chateau motif and within its walls is to be found an atmosphere as Parisian as its name. Here Pratt & Lambert Varnish Products proved their adaptability in fulfilling the spirit and purpose of the decorative scheme. The P&L Architectural Service Department nearest you is eager to help you obtain maximum finishing results in your work. Pratt & Lambert-Inc., 108 Tonawanda St., Buffalo, N. Y. In Canada: 28 Courtwright St., Fort Erie, Ontario.

McGRAW-HILL BUILDING

AND while the battle rages over its architectural merit, the great bulk of the *McGraw-Hill Building* stands oblivious, uniquely reflecting the light of the day in its glazed, blue green surface. Nor can one but be impressed, in the viewing of it, with a feeling of security and solidity. Like other prominent and much discussed buildings of recent construction, the framework is of CB Sections, the most recent contribution to the efficiency of structural steel.

CARNEGIE STEEL COMPANY

Subsidiary of United States Steel Corporation

PITTSBURGH, PA.

184

CB SECTIONS

Fins BELONG ON FISH

not on concrete walls!

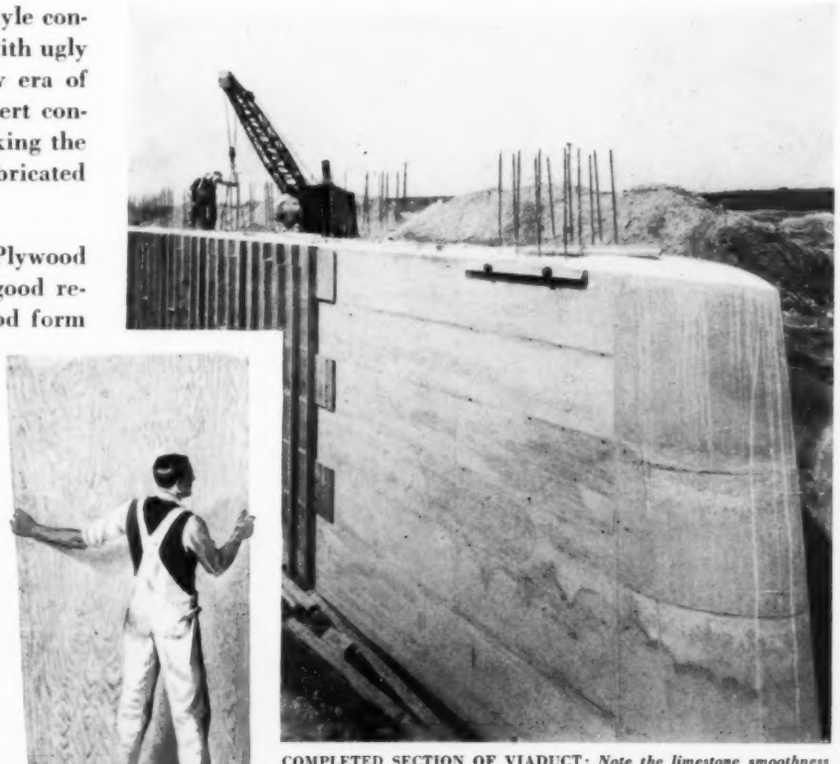
DOUGLAS FIR PLYWOOD FORM LUMBER GIVES YOU CONCRETE SURFACES SMOOTH AS LIMESTONE!

GOODBYE, old-style concrete walls — with ugly fins that are costly to rub off! A new era of concrete construction is here — and alert contractors and architects are already making the most of it with the new, specially fabricated and treated Douglas Fir Plywood.

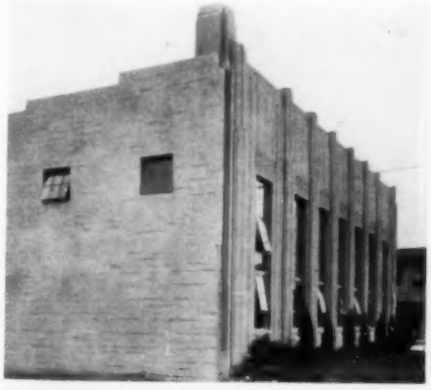
Ordinary commercial Douglas Fir Plywood can be used once or twice with very good results, but the *new* Douglas Fir Plywood form lumber gives you repeated use — as many as seven to ten times — plus the usual plywood advantages of light weight and speed in carpentry.

Douglas Fir Plywood comes in large-size panels up to 4 by 8 feet, saving fully 10% labor over shiplap construction. There are fewer joints in a plywood form — and these *stay tight*, retaining all the moisture in the concrete.

Mail the coupon below for helpful facts and a free sample.



COMPLETED SECTION OF VIADUCT: *Note the limestone smoothness of the concrete when Douglas Fir Plywood is used for form lumber. The surfaces need no plastering or rubbing. If painted, they need less paint, require less labor.*



ONE SIDE WAS SHIPLAP—*the other Douglas Fir Plywood? Observe the difference between the left sidewall of this bank building—and the smooth front wall obtained by the use of Douglas Fir Plywood. Douglas Fir Plywood is a perfect form material for flat surfaces, and an ideal backing for all kinds of pattern and reverse-mould work.*

DOUGLAS FIR PLYWOOD

REAL LUMBER
Engineered for greater size and strength

DOUGLAS FIR PLYWOOD MFRS., Dept. 632-H,
Sixth Floor, Skinner Bldg., Seattle, Washington.

Gentlemen: Please send me a free sample of the new special Douglas Fir Plywood for concrete forms, and your Bulletin on "How to Make Concrete Flawlessly Smooth at Low Cost."

*Name*_____ *Address*_____

*City*_____ *State*_____

*Firm Name*_____

Check here ☐, if you are interested also in Douglas Fir Plywood as a wallboard and cabinet lumber, and additional information will be sent you.

H & H

TIMED TO THE NEED

OUTDOOR FLUSH RECEPTACLE

CLOCK HANGER OUTLET

for the **SHOWPART** *of the wiring job*

No. 7792

OUTDOOR RECEPTACLE provides permanent place to plug in electric appliances or outdoor lighting connections. Saves owners the nuisance of temporary wiring from the inside. . . Weatherproofed against action of rain, ice or continuing dampness. Cadmium finish on brass defies rust and corrosion. When not in use, metal cap screws over receptacle opening for further protection. When connected, the standard attachment plug cap is covered with separate metal cap (No. 7793) which screws onto flush plate. Rubber mat fitting under plate completes the weatherproofing. *Specify No. 7792* for bringing lamps and electric conveniences OUTDOORS on porches, terraces etc. and for decorative lighting of lawns or Christmas trees. . . Data-sheet on request.

No. 7707

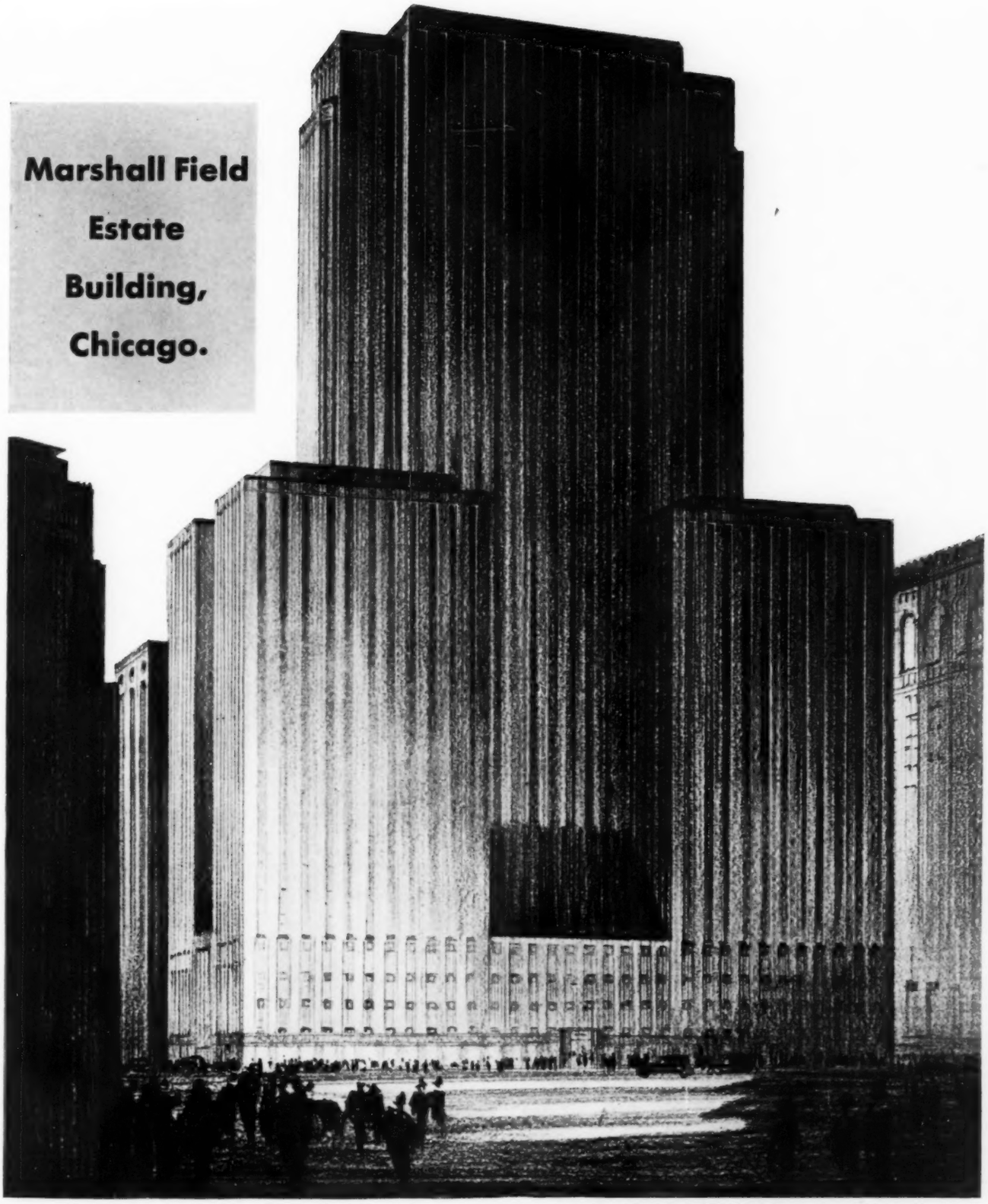
No. 7793

CLOCK HANGER OUTLET does away with straggling cord connections from clocks to nearest receptacles. At the same time gives firm support to the clock. . . Receptacle part is recessed, so plug cap is sunk flush with wall. This allows clock to hang flat over the outlet, with wire connection and receptacle wholly concealed. Increasing use of electric clocks makes this device most *timely* in your new buildings. Specify it for residences, modern offices; schools, hospitals and institutions wanting electric time. . . . Write for data-sheet with complete listings.

HART & HEGEMAN DIVISION

THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

Marshall Field Estate Building, Chicago.



Architects and Engineers: Graham, Anderson, Probst and White; *Contractors:* George A. Fuller and Company, Inc.

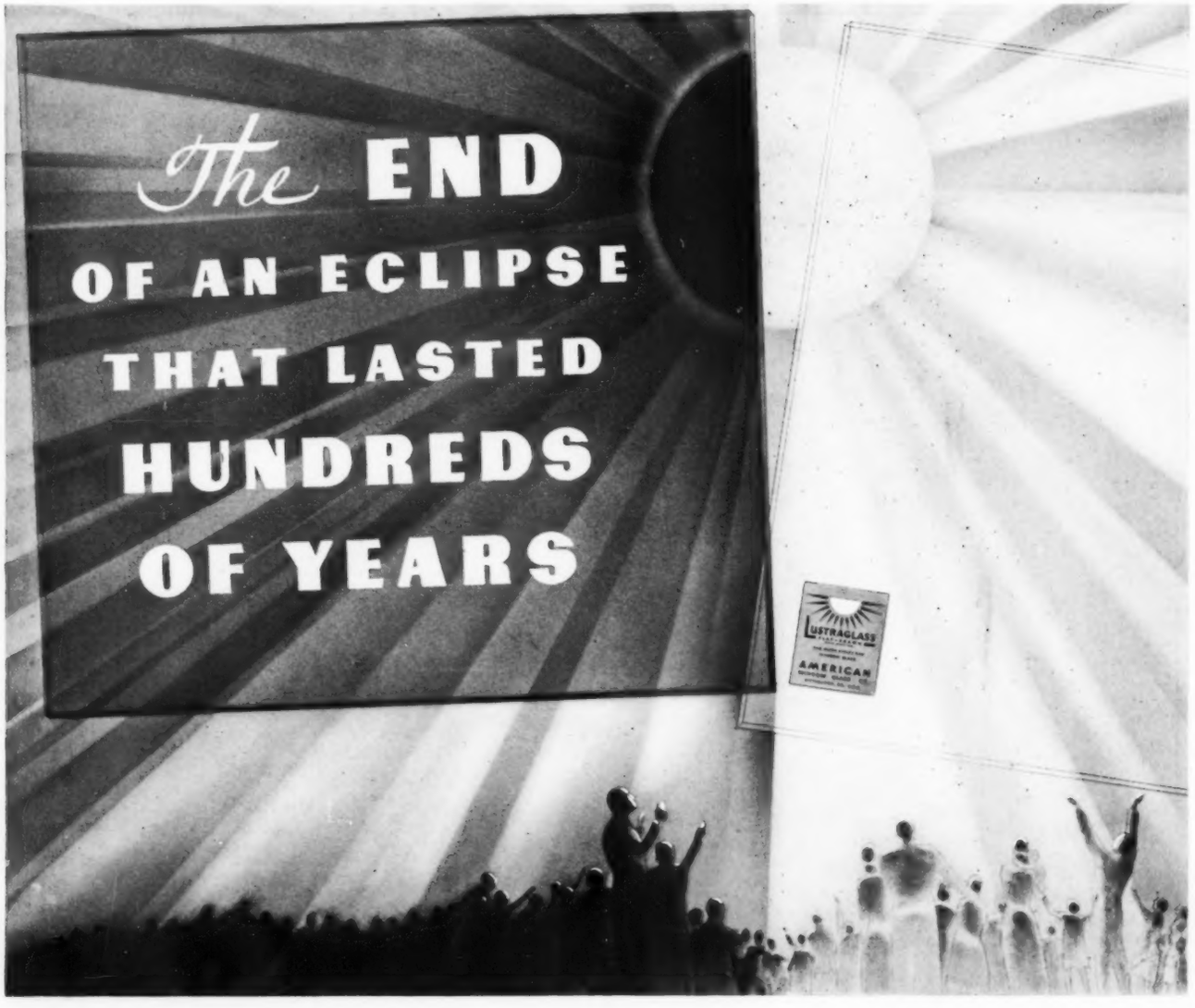
BETHLEHEM STEEL COMPANY, *General Offices:* Bethlehem, Pa. *District Offices:* New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Pittsburgh, Buffalo, Cleveland, Cincinnati, Detroit, Chicago, St. Louis, Houston, Dallas. *Pacific Coast Distributor:* Pacific Coast Steel Corporation, San Francisco, Los Angeles, Portland, Seattle, Honolulu. *Export Distributor:* Bethlehem Steel Export Corporation, New York.

FRAMEWORK OF

BETHLEHEM

WIDE-FLANGE

STRUCTURAL SHAPES



No longer need you tolerate that greenish cast which is characteristic of ordinary window glass . . .

For centuries, scientists realized that the greenish cast in qlass for windows impeded the transmission of sunlight. Now, after hundreds of years of unsuccessful attempts to remove this very objectionable color, comes Lustraglass . . . practically free from green . . . the whitest of all glass made for windows. It transmits more daylight and a substantial amount of the shorter (more valuable) ultra-violet rays of sunlight, yet, with all its many extra advantages, it costs no more than ordinary window glass. • Naturally, Lustraglass has the preference of architects and builders everywhere. If higher quality, more brilliant lustre, and increased transparency are important factors to be considered . . . if they can be had at no extra cost . . . Then there can be no reason for writing anything less than Lustraglass into a specification . . . You will be interested in our booklet A-430; it's yours for the asking. Write:

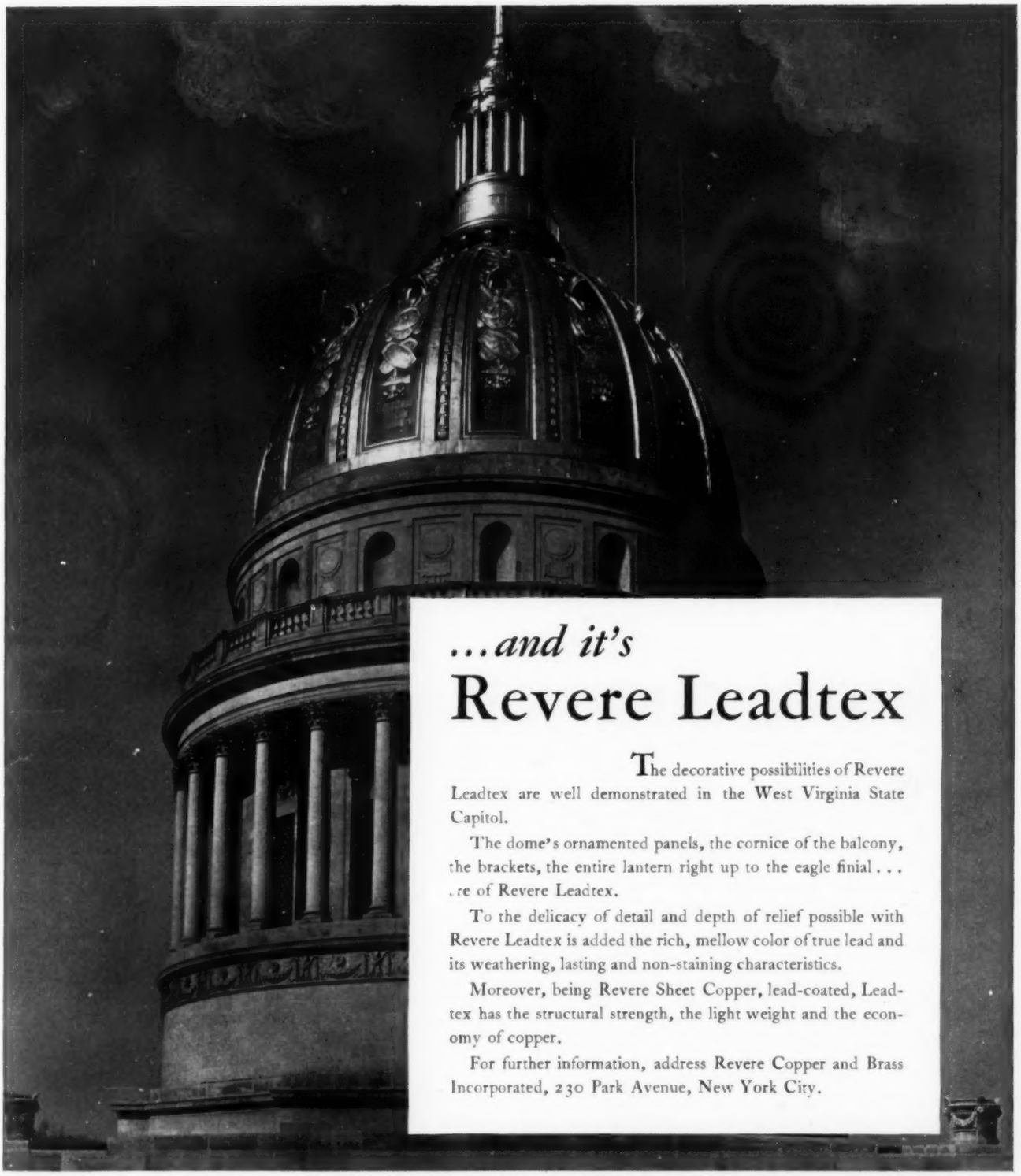
AMERICAN WINDOW GLASS COMPANY • FIFTH AVENUE • PITTSBURGH, PA.

Also makers of Lustrawhite Picture Glass, Armor-Lite Safety and Bullet-Proof Glass, Tintaglass, Photographic Dry Plate Glass, 3/16" and 7/32" Crystal Sheet Glass, Ground, Chipped, Bulb Edge Glass.

LUSTRAGLASS

the ultra violet ray window glass

The superiority of Lustraglass is easily proved by the most skeptical: Take several samples of window glass of various makes, including Lustraglass, hold them together and look at them edgewise against the light. You can immediately distinguish Lustraglass by its whiteness—its absence of color.



...and it's
Revere Leadtex

The decorative possibilities of Revere Leadtex are well demonstrated in the West Virginia State Capitol.

The dome's ornamented panels, the cornice of the balcony, the brackets, the entire lantern right up to the eagle finial . . . are of Revere Leadtex.

To the delicacy of detail and depth of relief possible with Revere Leadtex is added the rich, mellow color of true lead and its weathering, lasting and non-staining characteristics.

Moreover, being Revere Sheet Copper, lead-coated, Leadtex has the structural strength, the light weight and the economy of copper.

For further information, address Revere Copper and Brass Incorporated, 230 Park Avenue, New York City.

Architect: Cass Gilbert, New York . . . General Contractor: George A. Fuller Co., New York . . . Sheet Metal Contractor: E. Van Noorden Company, Boston . . . Ornamental Stamping: Miller & Doing, Brooklyn

Revere Copper *and* Brass

INCORPORATED

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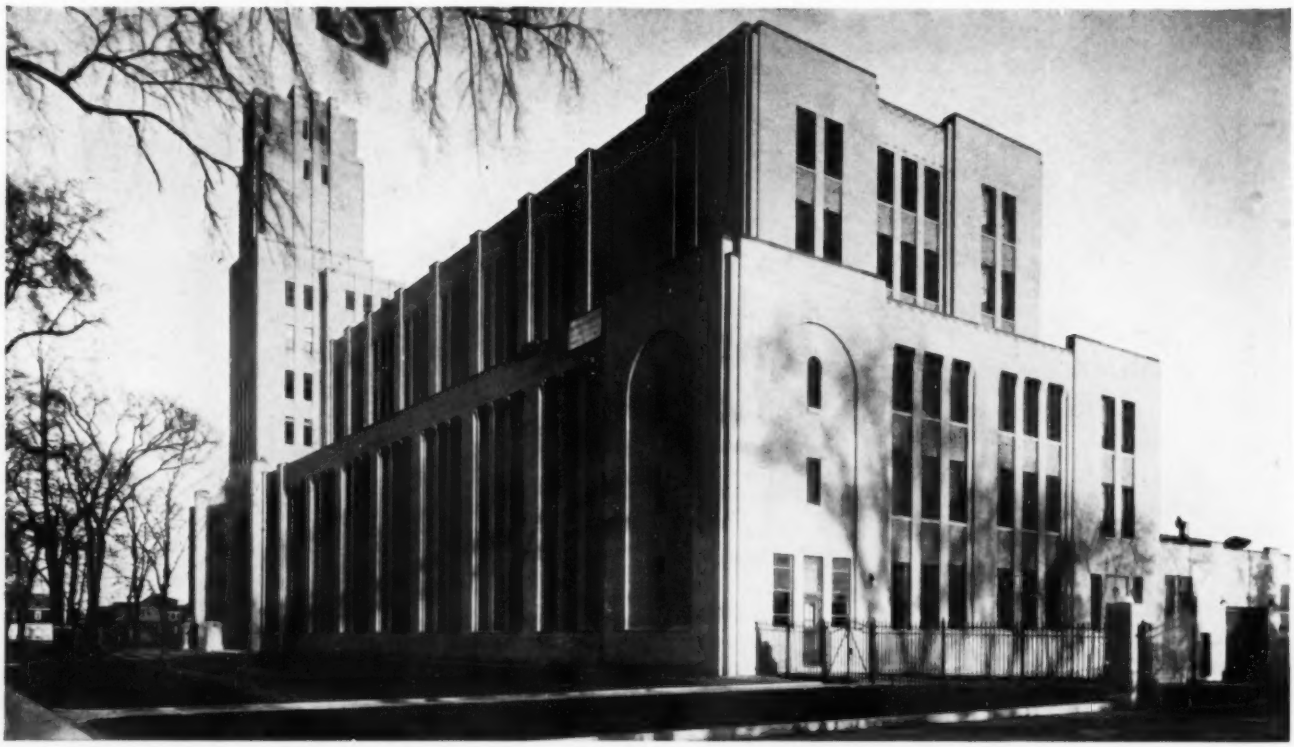
SPECIFIED

FOR BEAUTY, UTILITY AND ECONOMY



New England Distributing Center of the Western Electric Company, Watertown, Massachusetts. Architects and Engineers: Monks & Johnson, Boston. General Contractor: G. B. H. Macomber Company, Boston.

THE New England Distributing Center of the Western Electric Company illustrates a practical use of Libbey·Owens·Ford Polished Plate Glass and Libbey·Owens·Ford flat drawn Window Glass in combination.

In the front of the building, where appearance is a major consideration, all the windows and doors are glazed with L·O·F $\frac{3}{16}$″ Polished Plate Glass, because beauty is the final note of quality in a perfect architectural conception.

In the lower two rows of each sash* on the sides and in the rear, where beauty is still desirable but economy must be exercised in achieving it, L·O·F Double Strength "A" Quality Glass is used because of its exceptionally high quality and remarkable clarity. For all interior glazing, L·O·F Double Strength "A" Quality was also specified.

This building is an outstanding example of the beauty, utility and economy that may be attained by specifying different kinds of glass for specific purposes—and of the finished perfection which results when all the glass bears the name of Libbey·Owens·Ford.

• • •

*** The upper three rows of this sash are glazed with Industrex, a superior figured glass manufactured by the Blue Ridge Glass Corporation, of Kingsport, Tennessee, and distributed by the Libbey·Owens·Ford Glass Company.**

LIBBEY·OWENS·FORD GLASS CO., TOLEDO, OHIO, ***Manufacturers of Highest Quality Flat Drawn Window Glass, Polished Plate Glass and Safety Glass; also distributors of Figured and Wire Glass manufactured by the Blue Ridge Glass Corporation of Kingsport, Tennessee.***

LIBBEY·OWENS·FORD
QUALITY GLASS

Micarta Walls

—for the modern bath ▲ ▲ ▲

A review of recent bathroom designs indicates a trend towards walls with large unbroken areas, with or without decoration.

Micarta is an ideal material for such walls. Panels of Micarta are not affected by moisture, even by the drenching of a shower. They are easy to clean, too. Wiping with a soapy cloth will restore the original gloss.

A wide variety of flat colors and patterns permits ample flexibility of color scheme. Attractive designs can be effected with a combination of harmonizing colors. The decorative possibilities of Micarta are almost unlimited—even special inlaid patterns can be supplied.

Let us tell you more about Micarta—the new material for interior decoration. Mail the coupon.

Westinghouse

T 79120

Quality workmanship guarantees every Westinghouse product

SEND FOR INFORMATION

Westinghouse Electric & Manufacturing Company
Room 2-N—East Pittsburgh, Pa.

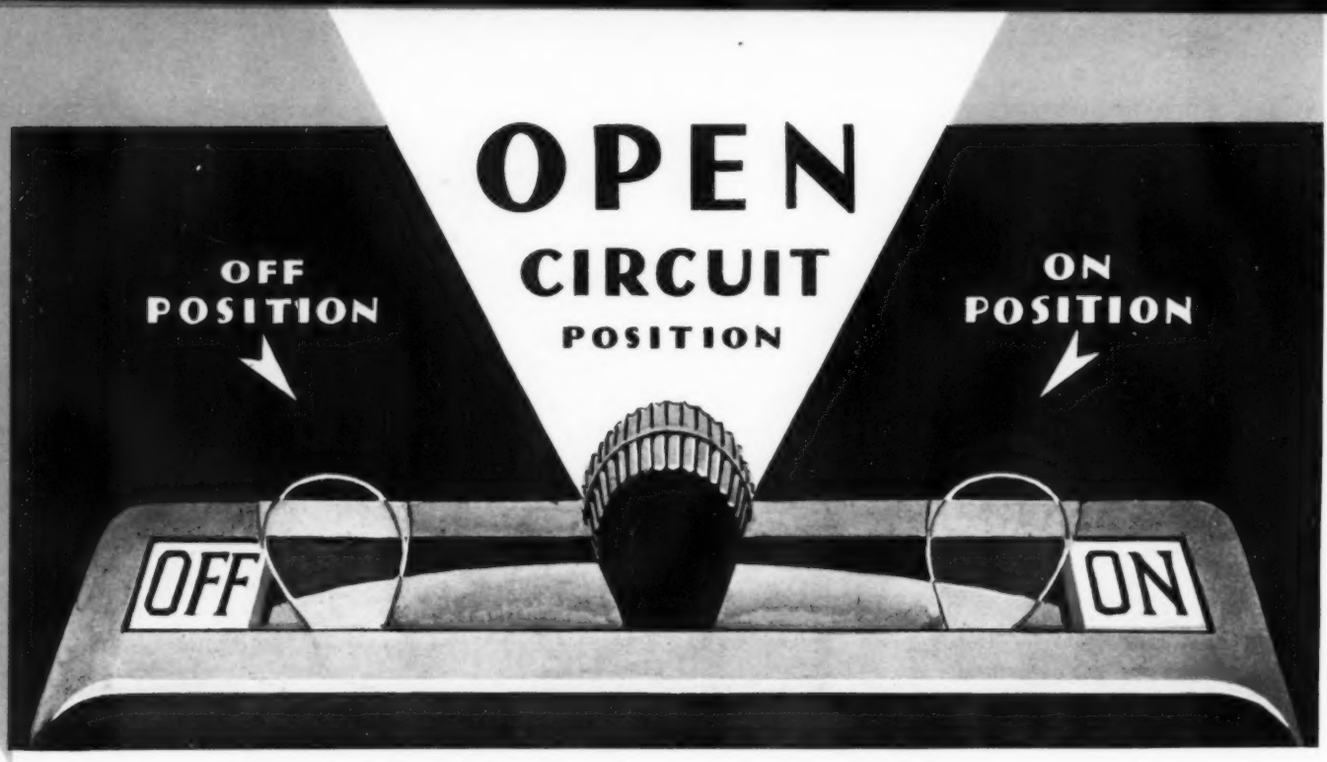
Please tell me more about Micarta—the new material for interior decoration.

Name .....

Company .....

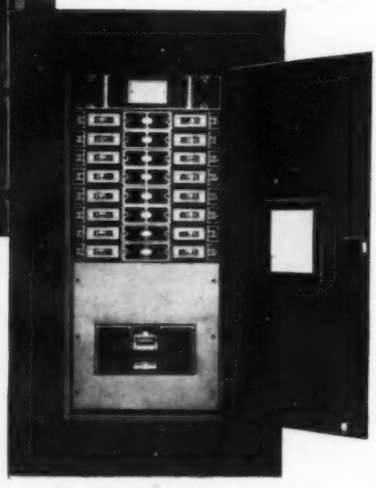
Address .....

City ..... *State* .....



a **GLANCE** *shows the open circuit*
a **FLIP** *restores Service – with*
NOFUZE PANELBOARDS

"ON", "OFF" and Tripped positions of "De-ion" breakers are clearly distinguishable—even in the dark—making service restoration quicker and easier.



Nofuze Lighting Panelboard equipped with "De-ion" Breakers. Completely dead-front, it cannot be blocked nor its calibration changed.

A GLANCE at a Nofuze panelboard shows the opened circuit, because the handle of the "De-ion" breaker which replaces fuses in these panelboards automatically moves to a position mid-way between "ON" and "OFF" when opened by an overload. Even in the dark this positive indication makes detection easy.

Anyone can restore service instantly by a mere flip of the handle. No longer is it necessary to await an electrician's arrival to replace a blown fuse.

Tenants appreciate this quick restoration of service which enables them quickly to obtain light to speed their work, and power to operate adding machines, motion picture projectors, automatic typewriters, etc.

Mail the coupon for further information.

SEND FOR BOOKLET

Westinghouse Electric & Manufacturing Company
Room 2-N, East Pittsburgh, Pa.

Gentlemen: Please send me a copy of D. M. F. 5150, Nofuze Panelboards.

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Company .....
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City ..... *State* ..... AR 6-32

Westinghouse

T 79109

Quality workmanship guarantees every Westinghouse product

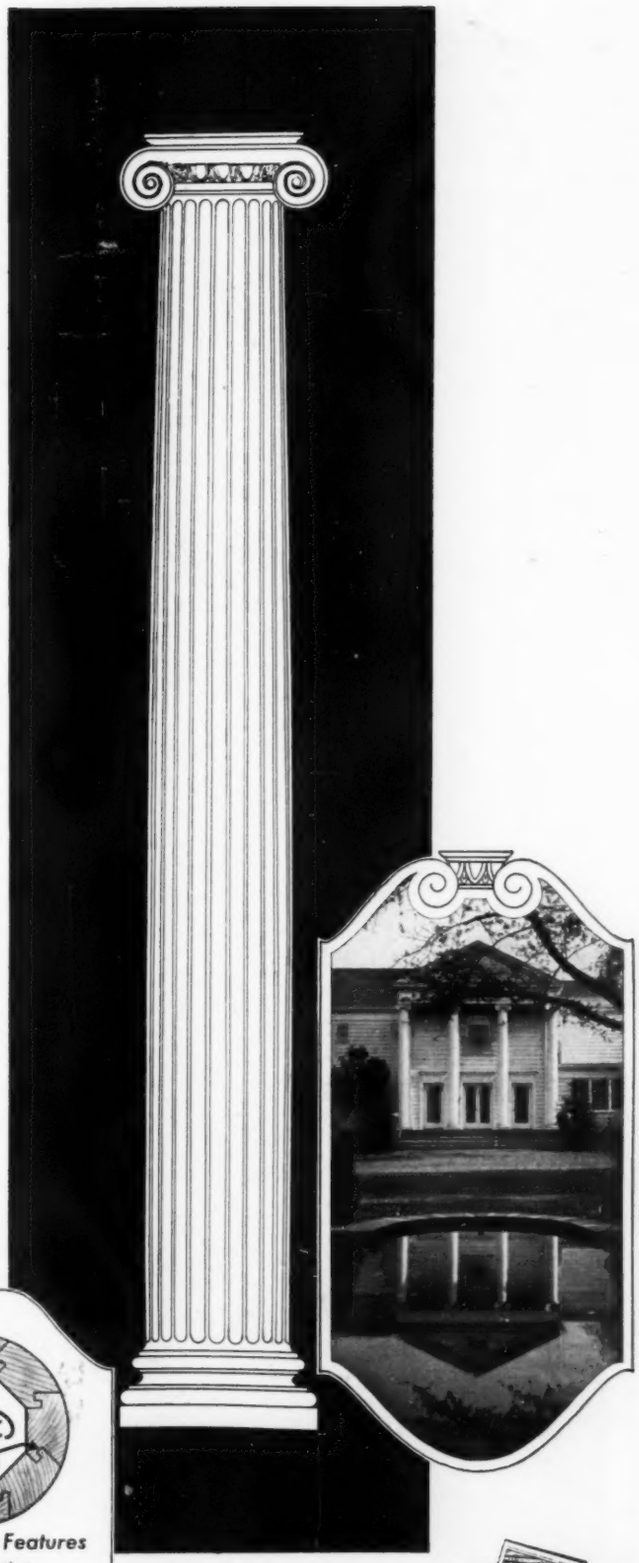
AN IDEA for ARCHITECTS

Here's a way to convert those usually unwelcome residence remodeling jobs into something of a pleasure and profit. Nothing will emphasize more clearly the change from the old to the new than the use of a few stately columns or a beautifully designed entrance. Hartmann-Sanders make it easy for you to achieve something really fine in remodeling work by furnishing columns which lend correctness and artistry to every detail, and colonial entrances that are authentic and beautifully executed.

In selecting columns you will find that Hartmann-Sanders have a most complete line to choose from, all authentically correct, and constructed to resist time and the elements. They are made of absolutely clear, knotless lumber, from wood especially selected for its weather-resisting qualities. Staves are formed to correct entasis and are of uniform thickness throughout their length. They are permanently joined with Koll's Patent Lock Joint, illustrated below, which absolutely prevents loosening or coming apart, and are glued with waterproof glue.

Careful, exact workmanship, born of more than thirty years experience, is evident in the fidelity with which their smallest detail is executed.

You and your clients will find lasting satisfaction in their enduring beauty.



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COLUMNS
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GARDEN STRUCTURES
EXTERIOR MILLWORK

Eight Superior Features

1. Lock-Joint Construction.
2. Authentic in Design.
3. Each Stave Formed to Correct Entasis.
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5. Clear Lumber. Not a Knot in 10,000.
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Send for these FREE books

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Please send me free, copies of the books checked below:
Hartmann-Sanders Lock-Joint Columns ☐
Garden Structures ☐ Colonial Entrances ☐

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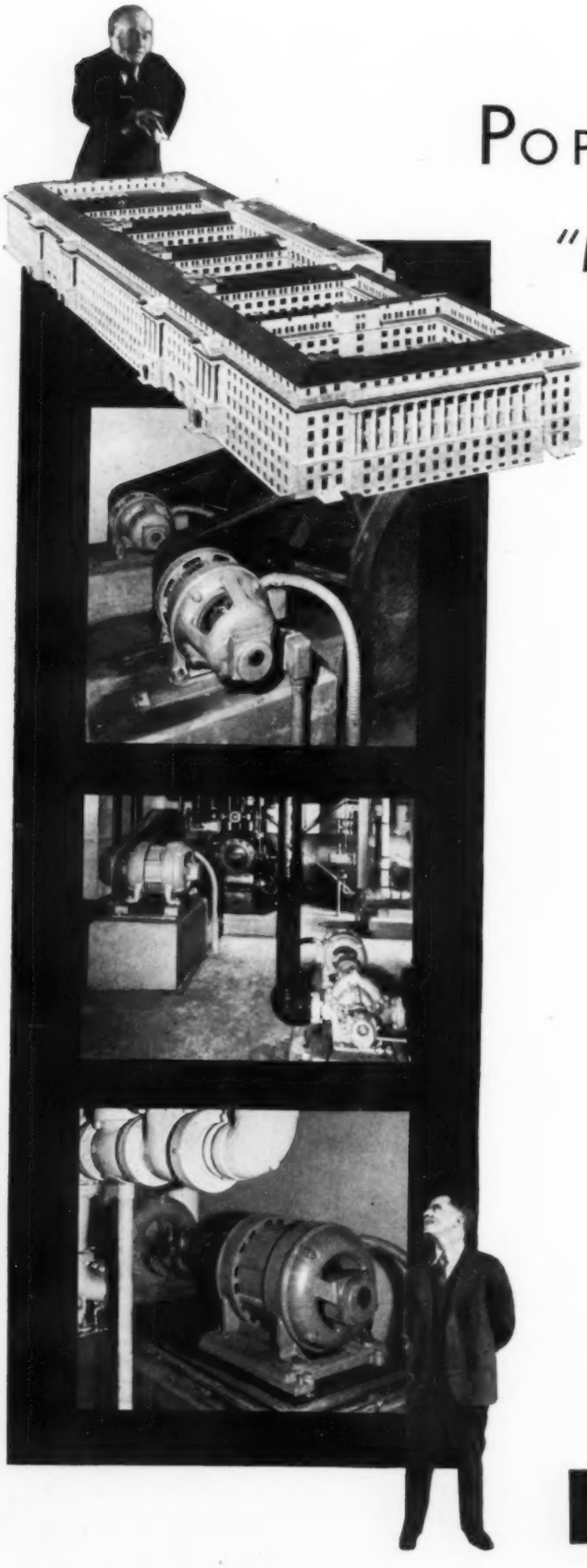

POP AND LAD INSPECT "LINC-WELD" MOTORS IN UNITED STATES DEPARTMENT OF COMMERCE BUILDING

"Look it over, Lad. It's the largest office building in the world and we helped pay for it.

"I see at least we got our money's worth in the motors. They're Lincoln *'Linc-Welds'*.

"That's more than you can say about some of the congressmen whose salaries our taxes help pay."

"Righto—and what's more, these *'Linc-Weld'* motors do more work with less noise.

"Of course, the *'Linc-Weld'* motors have that extra horse-power which gives them an advantage.

"But there are some good congressmen, and you'll find they generally stay on the job longest—like *'Linc-Welds.'*"

LINCOLN

THE LINCOLN ELECTRIC COMPANY, CLEVELAND, OHIO

Manufacturers of *"Linc-Weld"* Motors and *"Stable-Arc"* Welders

A NEW *distinctive* COLOR* *identifies* SPANG *copper-clude* PIPE

An unusual pipe requires an unusual marking. Hence, the adoption of a rich copper-tan color as the distinguishing mark of genuine Copper-Clude to avoid confusion with similar competitive products.

Here is an alloy steel pipe doubly protected against all forms of atmospheric corrosion by a uniform blending of copper plus a tenacious copper-tan coating of paint.

So be guided by the copper-tan marking in your selection of the best in copper-bearing pipe . . . Remember that "Spang" Copper-Clude combines economical first cost with long trouble-free service.

A copy of our new Copper-Clude Booklet will be sent on request.

SPANG, CHALFANT & CO., INC.

General Offices: Clark Building
Pittsburgh, Pa.

Sales Offices: New York, Boston, Pittsburgh, Chicago, St. Louis, Tulsa, Los Angeles, Dallas, San Francisco

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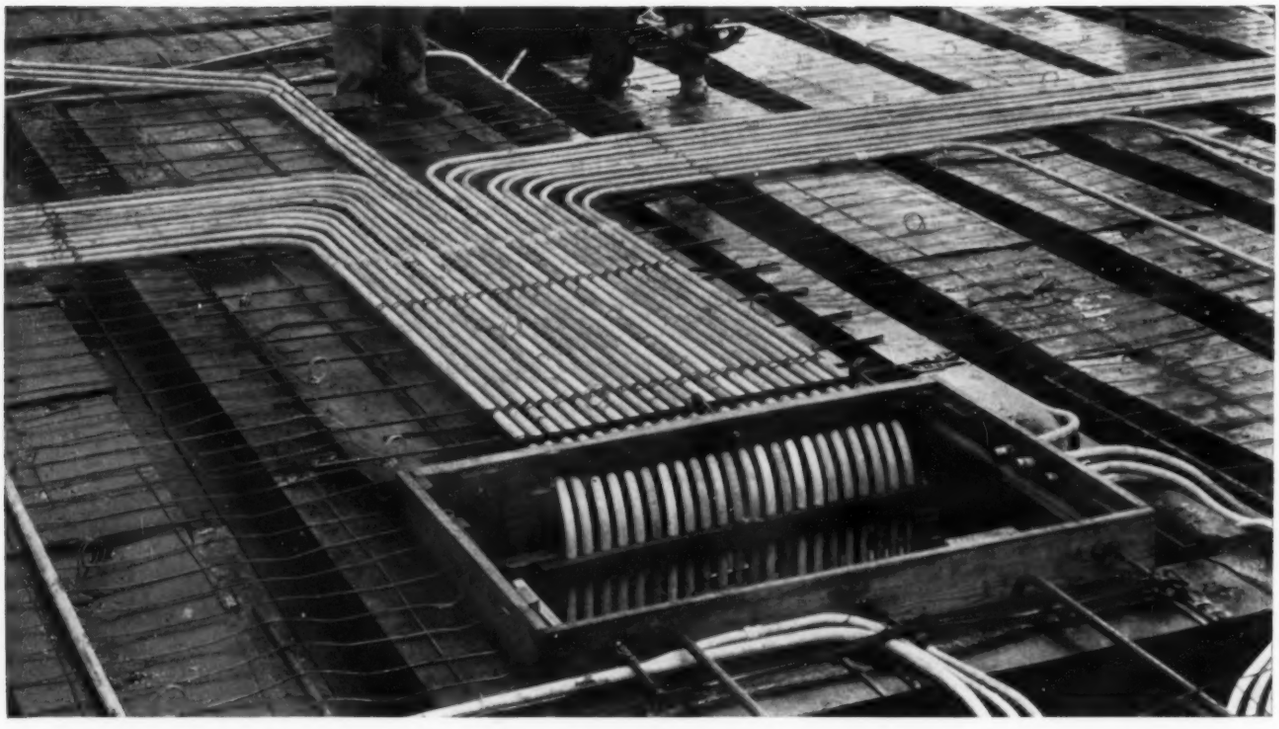
HERE'S THE WAY A STEELTUBES JOB LOOKS

. . . note the straight runs and even bends



Steeltubes in Skirvin Tower, Oklahoma City, Oklahoma. Architects, Layton, Hicks & Forsyth, Oklahoma City; Electrical work by Roy White, Oklahoma City; Material furnished by Glasco Electric Co., Oklahoma City. Approximately 95,000 feet of Steeltubes being used.

● "Looks" isn't everything. But, neat, workmanlike appearance is an indication of quality . . . even in concealed electrical conduit work. Steeltubes conduit jobs, done by competent wiremen, are good jobs, and look the part.

Over 25,000,000 feet of Steeltubes Electrical Conduit have been installed. Steeltubes is fully approved for open and concealed wiring . . . has official approval for government work . . . has the acceptance of contractors. And wiremen like it.

• *Steeltubes is made in seven standard sizes, from ⅜ inch to 2 inches, with same inside diameter as old-style conduit.*

Steeltubes is lighter . . . bends easier . . . cuts easier . . . and there's no threading. That's why it reduces the cost of conduit work.

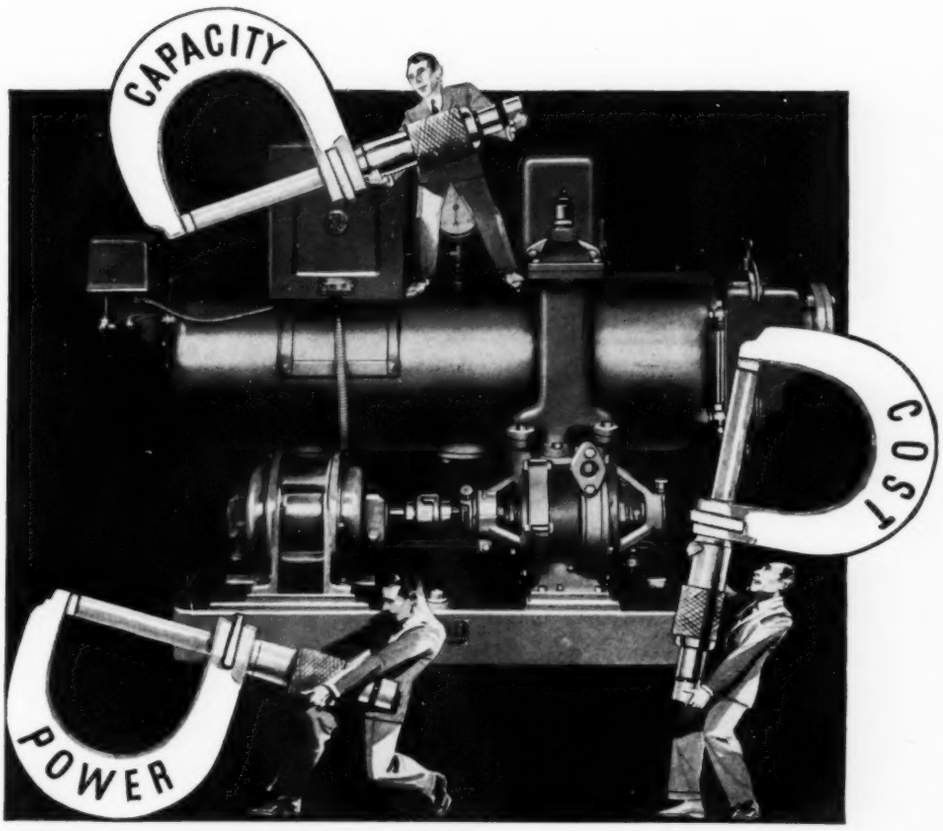
Get the facts about Steeltubes. Figure it on your next job. Write for full information and samples . . . or look up Steeltubes in Sweet's.

Electrical Division, **STEEL AND TUBES, INC.,** *Cleveland, Ohio*

(A UNIT OF REPUBLIC STEEL CORP.)

STEELTUBES

THREADLESS THINWALL CONDUIT



GAUGED BY *Every Standard*

a Jennings Heating Pump gives you more for your money

•

This is no time for blind buying. Today, when you purchase a heating pump, you want maximum value for every dollar. Here's one sure way to get it. Use these three measures of heating pump worth: CAPACITY, POWER CONSUMPTION, and COST.

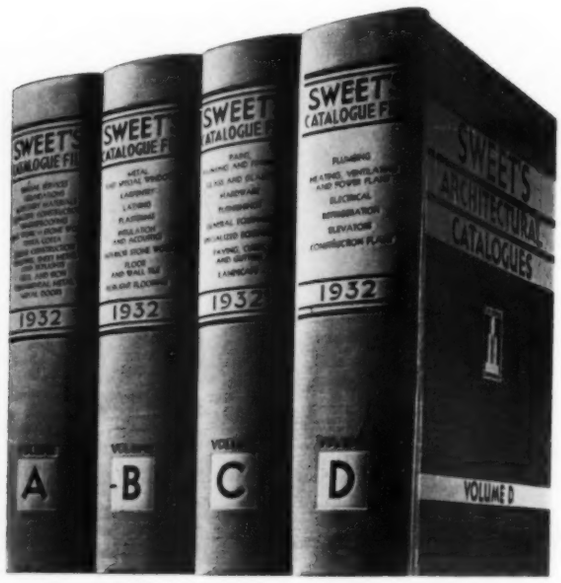
Jennings Vacuum Heating Pumps are noted for generous capacity. If, instead of a pump, you were buying volumes of water and air removed from the system, each dollar invested in a Jennings would purchase more.

Operating and maintenance costs, too, are less for Jennings Pumps. These efficient units consume less power; require less attention. Often they serve 10 and 15 years without repairs or replacements.

And, when it comes to selecting a pump by ratings in sq. ft. of radiation, remember this: insist on minimum power consumption and a definite air and water capacity in a given time, and you can always purchase a Jennings at a lower first cost.

NASH ENGINEERING COMPANY, 13 WILSON ROAD, SOUTH NORWALK, CONN.

Jennings Pumps



BEHIND *the* SCENES

The interest expressed by many of Sweet's users in the "machinery" which produces and distributes this file of manufacturers' catalogues prompts us to present a brief description of the operations involved.

PRELIMINARY

Seventeen district managers and their assistants, working out of offices strategically placed from coast to coast, make preliminary arrangements with building product manufacturers, receive their orders and transmit their detailed instuctions to the proper department in the home office in New York.

CATALOGUE PREPARATION

Architectural and Engineering Consultants

In order that catalogues in Sweet's may contain information of real usefulness to you, the services of a staff of consulting architects, engineers and contractors are placed at the manufacturer's disposal without charge. All members of this staff are men of practical experience. Most of them are members of the A.I.A. and have previously conducted successful private practices. They have compiled scores of the most comprehensive and useful catalogues in Sweet's.

Copy Service

Sweet's maintains, in addition, an experienced copy staff, which operates under instructions from the consulting staff or direct from the manufacturers.

Editorial Service

Catalogues are then reviewed and edited from the users' point of view to check any facts, figures, statements or illustrations which might not be understood or might mislead and suggestions for changes are forwarded to manufacturers for approval and incorporation before printing.

CLASSIFYING AND INDEXING

This work proceeds concurrently with the receipt of okayed proofs. Catalogues are first classified into sections according to products catalogued and then alphabetically as far as possible by manufacturers' names within each of these sections. These important operations, which require up-to-date and extensive knowledge of all products and expert supervision, contribute greatly to the usefulness of the Sweet's file.

PRINTING AND BINDING

After copy in proof form has been approved by manufacturers (1,314 in the current edition) it is printed, as fast as forms can be assembled, in one of the largest and best equipped plants in the country. 12 carloads of paper were required for the current edition. Finally 60,000 separate volumes are bound to withstand the rugged and constant handling they will receive.

DISTRIBUTION

Now comes the work of getting upwards of 250 *tons* of manufacturers' catalogues to their proper destinations, in order that they will be accessible in 13,000 offices of architects, engineers and general contractors. The lists have been kept up-to-date throughout the year through Dodge Reports and other authentic records. Shipping cartons, labels and receipts are ready. For a solid month thousands of sets of Sweet's file move by freight, express, parcel post and motor truck—and a new, up-to-date edition has reported for duty, to carry on the work of its predecessor. Throughout the year, as important new firms are reported by the 500 reporters and correspondents of F. W. Dodge Corporation, of which Sweet's Catalogue Service is a division, these firms are provided with the Sweet's file.

* * * * * * *

The cycle is endless. The 1933 edition is now well under way.

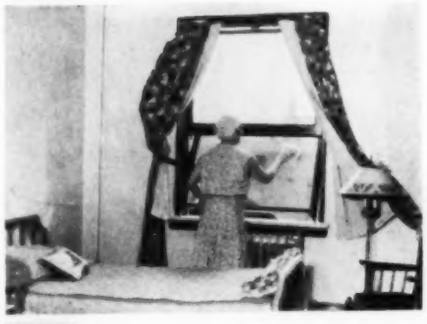
SWEET'S CATALOGUE SERVICE

Division of F. W. Dodge Corporation

119 WEST 40th STREET, NEW YORK, N. Y., and principal cities

1998 Windows THAT WILL Soon BEGIN PAYING For THEMSELVES

St. Mary's College and Academy Building, Monroe, Mich. D. A. Bohlen and Son, Architects, Indianapolis, Ind.



Cleaning is so quick, easy and safe with Williams Reversible Window Equipment that anyone can clean these windows.

In addition, these superior windows provide draftless ventilation.

THE WILLIAMS PIVOT SASH CO.

East 37th St. at Perkins Ave.

Cleveland, Ohio

1998 WINDOWS TO CLEAN

When the new St. Mary's College and Academy, Monroe, Michigan is completed, Williams Reversible Window Equipment will enable that institution to save substantially on window cleaning costs. Since both sash are reversible, cleaning will be done from the INSIDE at floor level. The building personnel will do the cleaning instead of high priced professional cleaners. Windows will be washed more frequently in far less time and the resultant saving will enable these windows to pay for themselves in a few years.

Send for new illustrated catalog showing widespread and repeated use.

For 28 years Manufacturers and Installers of

WILLIAMS REVERSIBLE WINDOW EQUIPMENT

Clean Your Windows from the Inside

ENTRANCE CORRIDORS OF WESTERN UNION BUILDING
New York City

VOORHEES, GMELIN & WALKER
Architects

CEILING VAULTS OF GUASTAVINO TIMBREL ARCH CONSTRUCTION
WITH SOFFIT TILE TO MATCH THE SIDE WALLS,

ERECTED BY

R. GUASTAVINO COMPANY

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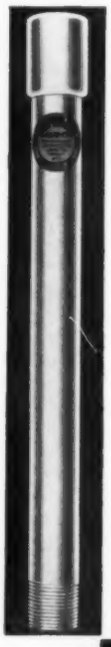

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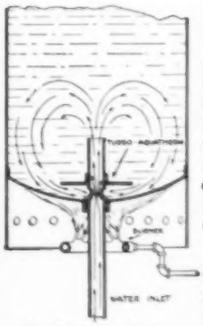

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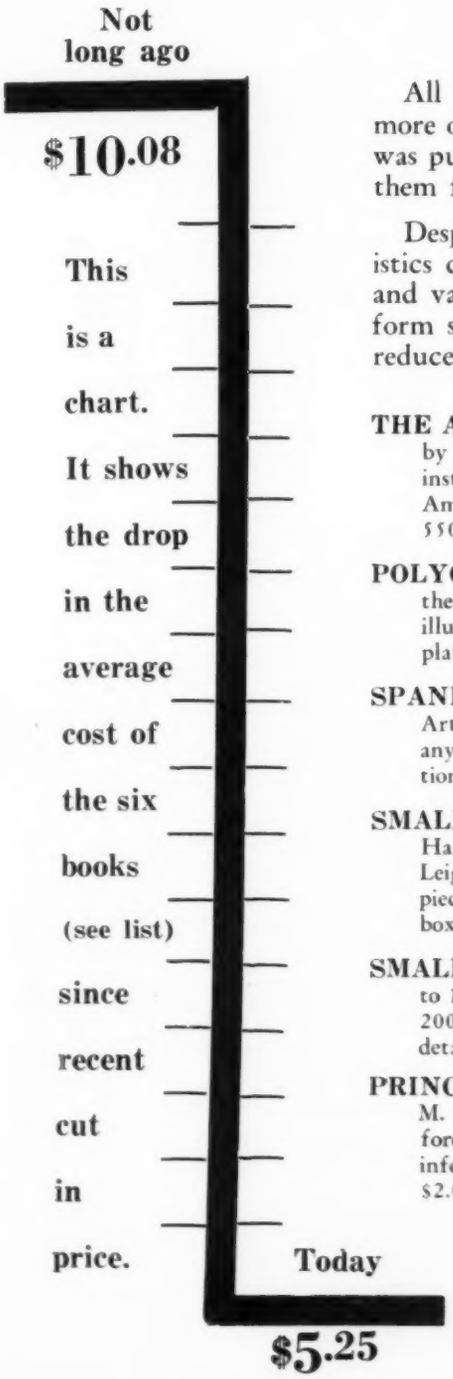
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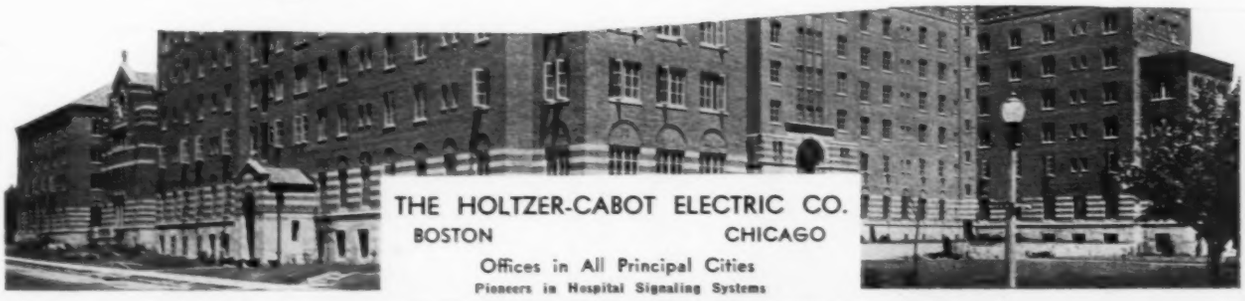
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